THE IRON TRADE REVIEW

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PIG IRON INQUIRY

IS EXTREMELY HEAVY FROM MANY SOURCES.

Iron Ore Sales Continue—Tremendous Movement on Lakes Expected—Chartering by Steel Corporation.

Pending pig iron inquiry is heavier than at any time since last October. A number of the most important melters, including leading cast iron pipe, pump, malleable and electric companies, have appeared in the market for large tonnages, and in some cases sales have been made, but the inquiry has been done very quietly, with the evident intention of avoiding the advancing of prices. A part of this inquiry is for delivery during the last half of the year, and, in fact, there is constantly increasing interest on the part of buyers in the market for that period. This inquiry for advanced delivery has developed a rather surprising eagerness on the part of some furnace interests to take business, and quotations for the last half sometimes show little, if any, advance over those for the first half. Business pending in the central west includes about 60,000 tons at Buffalo, of which half is malleable for companies at Erie and Rochester. In spite of dullness in the foundry market in the Philadelphia district, sales amounted to about 30,000 tons, including 20,000 tons of basic to a plate manufacturer.

Iron Ore Conditions

The selling of non-Bessemer Lake Superior ores continues at a very satisfactory rate, and it is now estimated that sales of all grades to independent interests aggregate nearly 16,000,000 tons. The Steel Corporation, through the Pittsburg Steamship Co., has chartered vessels to move 15,000,000 tons of ore this year, and will move about 12,000,000 tons in its own ships, making a total of 27,000,000 tons for this one interest, a movement which was never equalled by all interests until 1902, when 27,500,000 tons was shipped from Lake Superior mines, a gain of 7,000,000 tons over the preceding year. It is expected that independent interests will ship 23,000,000 tons this year, making a grand total of 50,000,000 tons. Ore freight rates having been advanced 5 cents per ton and ore unloading charges reduced 5 cents per ton, vessel interests have before them the prospect of making $5,000,000 more under the new rates than would have been done on a 50,000,000-ton basis last year at the old rates.

Utilizing Slag

The increasing use of blast furnace slag in the manufacture of cement is illustrated in a striking way by the announcement that the Steel Corporation has authorized the expenditure of $2,450,000 to increase the capacity of the Indiana plants of the Universal Portland Cement Co. This company in 1900 turned out only 32,443 barrels of Portland cement; its output for 1909 was 5,786,000 barrels, and its estimated output for this year is 8,000,000 barrels, while additions to be made at Buffington, Ind., and Pittsburg, will bring the production for 1911 to 10,000,000 barrels.

Railroad Buying

There is still some complaint concerning the slowness with which railroads are placing orders, especially in the eastern territory, but rail orders of the week amounted to about 40,000 tons, of which 22,000 came from an eastern railroad. Car orders include 2,000 for the Nickel Plate; 1,000 50-ton gondolas for the Toledo & Ohio Central; 2,500 for the Cincinnati, Hamilton & Dayton, and 2,000 refrigerator cars for the Harriman lines.

Structural Material

Orders for structural material for the week amounted to about 18,000 tons for the country, of which the leading interest booked about 8,000 tons. Orders for western territory amounted to about 5,000 tons. The material for the Memphis Cotton Exchange building, 2,000 tons, will be fabricated by the Virginia Bridge & Iron Co. The car shops for the American Car & Foundry Co., St. Charles, Mo., 800 tons, will be erected by the Kenwood Bridge Co. An addition to the plant of the Goodyear Rubber Co., Akron, O., 2,000 tons, has been divided between the Cambria Steel Co. and T. H. Brooks & Co., Cleveland. The American Bridge Co. has taken an additional 2,500 tons for an extension of the New York Central railroad's terminal in New York City. Bethlehem sections will be used in a new theatre and office building, Broadway and Forty-third street, New York City, 1,100 tons, being built by the C. L. Gray Construction Co. An addition to the Rockefeller building, Cleveland, soon to be awarded, will require about 1,000 tons.

Finished Products

Probably 25,000 tons of plates will be required for riveted pipe lines, for which contracts are soon to be awarded. Contracts for steel bars are being made in a conservative way, and 1.50c, Pittsburg, is the prevailing quotation, although 1.45c can sometimes be done on very desirable business. Following the heavy contracting for tin plate, new business is not now very heavy. Manufacturers of hoops have made contracts covering the output of their mills for several months. The Wichita Natural Gas Co. has placed an order for 6 miles of 18-inch and 13 miles of 12-inch steel pipe for a gas line in Kansas. The material will be furnished by two makers.

THE WEEK IN IRON CENTERS

PITTSBURG.

Market Generally Quiet—Large Tonnage of Sheets—Pig Iron Dull.

Office of THE IRON TRADE REVIEW,
510 Park Building, Jan. 18.

Somewhat of a general lull has fallen upon the finished iron and steel market in the way of buying originating from new enterprises and this seems to be influenced both by the present season and by a tendency to await the outlining of definite legislative policies in the pending congress. Probably the most conspicuous form of buying absent in the current market is that by the railroads, which are moving slowly in the awarding of new car equipment and rail contracts, especially in the east. The western and southern rail mills are in a comfortable position and have a very promising outlook in the way of contemplated construction, but prospects before eastern makers are rather doubtful.

The market is not without some notable exceptions to its ruling quietness. A very favorable tonnage of new business in sheets is coming out and some makers are so filled up that they are finding difficulty in accommodating buyers. In steel bars there is also a fair offering for second quarter needs.

The general position of the mills as to orders booked continues extremely satisfactory, as buyers are specifying liberally against contracts and in sufficient volume to keep the tonnage of unfilled orders well sustained. As a consequence deliveries being made at makers' convenience show little improvement. Reports are that the middle west and western mills are probably in a better position as to business on hand than some of the eastern makers, among whom there is evidence of price concessions being made on desirable contracts in certain finished lines.

Continued buying of steel, particularly open-hearth, by some large steel makers lends encouragement to the situation as indicating the enormous finishing operations of these plants. There appears to be a growing movement in pig iron buying in some centers, but the Pittsburg market is dull. The Connellsville coke situation shows easiness and some softness, but the general condition is being well sustained.

Pig Iron.—Dullness is the striking characteristic of the pig iron market in the Pittsburg territory, as contrasted with the increased activity reported from other centers. Consumers in this district are drawing upon their contracts in a very favorable manner, but are apparently well covered for their early needs.

Some interest is being shown by melters in foundry iron for third quarter and last half shipment and sales of about 2,000 tons are reported upon a basis of $18 for No. 2 at a furnace in this district, but not in the valleys. A sale of a moderate lot of No. 2 to a Pittsburg melter is also noted. A transaction involving about 500 tons of Bessemer iron was put through in the week, but the details had no market bearing. A small lot of basic for immediate shipment brought $17.25, valley. Some buying of low phosphorus iron in other districts is noted. An Ohio foundry took 1,200 tons for first half, a Chicago steel interest 1,000 tons and a Milwaukee foundry about 600 tons. Several large inquiries outside the Pittsburg district are still pending, including those of malleable consumers and the one for 20,000 tons of varied analysis iron by a pump interest.

Sellers are inclined to be more hopeful upon the southern situation, and one of the leading makers, having entered a fair tonnage, reports that it is practically out of the market on $14 iron for second quarter. Foundry iron production in the south is said to have been considerably restricted. Cast iron pipe interests are credited with having made additional purchases of about 25,000 tons of low-grade southern irons in the week.

Pig Iron Prices.

(Prompt Shipment.)

Bessemer, valley	$19.00
Bessemer, Pittsburg	19.90
Basic, valley	17.00
Basic, Pittsburg	17.90
No. 2 foundry, Pittsburg	17.90
Gray forge, Pittsburg	17.15
Malleable, Pittsburg	18.15

(First Quarter.)

Bessemer, valley	19.00
Bessemer, Pittsburg	19.90
Basic, valley	17.25
Basic, Pittsburg	18.15
No. 2 foundry, Pittsburg	18.15
Gray forge, Pittsburg	17.15
Malleable, Pittsburg	18.15

Ferro-Alloys.—Carload buying, which is being done upon the basis of about $44.50, Baltimore, is the rule in ferro-manganese in Pittsburg territory. There is very little sizeable inquiry in any of the ferro-alloys. The 50 per cent ferro-silicon market has a stronger tone and some makers have advanced prices which are, however, above the current buying level. A sale of about 100 tons for immediate shipment at $62.50, Pittsburg, is reported.

We quote ferro-manganese at $44.50 to $45, Baltimore, for immediate shipment or for first half, and from $45 to $45.50 for second half. The freight from Baltimore to Pittsburg is $2.30.

Fifty per cent ferro-silicon is quoted at $62.50 to $63.50, Pittsburg; domestic 12 per cent, $25.90; 11 per cent, $24.90; 10 per cent, $23.90, Pittsburg, for prompt, first quarter and $1 advance for second quarter. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—There is considerable new plate consumption in prospect, but the market on business going under contract is rather quiet. It is estimated that probably 25,000 tons of plates will be required for pending riveted pipe lines. A number of the railroads are figuring upon cars, but few orders are being placed. Plate makers are rather welcoming the quieter tone in new business, as specifications continue heavy, and with some large makers deliveries are extended to three and four months and in some cases to longer periods. Some of the eastern mills do not appear to be so filled up as those of the Pittsburg and western territories, and shading of the 1.60c level is reported in some cases. We quote present prices as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.55c to 1.60c. Extras are as follows, per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½ inch to and including 3-16 inch plate on thin edge, 0.10c; under 3/16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—New business in sheets is especially active and the volume of contracts coming to makers from consumers is large. The sold up condition of the mills of some of the leading producers is rendering them unable to accept additional engagements and rejec-

tions continue to be made in some quarters. Specifications against contracts are very liberal, but large sheet makers are following a policy of 60-day deliveries and are succeeding very well in making shipments within this period. Some of the independents report deliveries of five to six weeks on both iron and steel sheets. Occasionally consumers, who are pressed by needs, are offering and paying premiums for prompt material. The additional eight sheet mills of the Youngstown Sheet & Tube Co. are expected to be in operation by March 1. We quote present sheet prices as follows:

Blue annealed sheets, Nos. 3 to 8, 1.70c; Nos. 9 and 10, 1.75c; Nos. 11 and 12, 1.80c; Nos. 13 and 14, 1.85c; Nos. 15 and 16, 1.95c; box annealed sheets, Nos. 10 and 12, 2.05c; Nos. 13 and 14, 2.10c; Nos. 15 and 16, 2.15c; Nos. 17 to 21, 2.20c; Nos. 22 to 24, 2.25c; Nos. 25 and 26, 2.30c; No. 27, 2.35c; No. 28, 2.40c; No. 29, 2.45c; No. 30, 2.55c; galvanized sheets, Nos. 12 to 14, 2.50c to 2.55c; Nos. 15 and 16, 2.60c to 2.65c; Nos. 17 to 21, 2.75c; Nos. 22 to 24, 2.90c; Nos. 25 and 26, 3.10c; No. 27, 3.30c; No. 28, 3.50c; No. 29, 3.60c; No. 30, 3.85c; painted roofing sheets, $1.70 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $3 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—Practically all the leading sources of consumption of tin plate are well covered by contracts extending over the first half and there is not a large amount of new requirement being closed. In some cases users have been dilatory in making contracts for their needs and they are now finding trouble in being covered through their regular means of supply. Specifications in tin plate are especially free for so early in the year as consumers are losing no opportunity to have their orders entered for material to be shipped in the ensuing seasons. The leading interest slightly increased its operations this week by starting two additional hot mills, and is now operating a total of 181 mills. The base price on tin plate, over which some premiums have been paid for desirable deliveries, is as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.60 f. o. b. mill, Pittsburg district.

Rails and Track Material.—Probably 3,500 miles of new railroad construction in southern and western districts is in contemplation and is expected to be put through within the next year. This new work, together with trolley road construction and maintenance needs, is looked to provide a larger rail tonnage for the western and southern mills. The eastern rail situation is not so promising owing to the large mill capacity, though negotiations are still under way. No important standard contracts are announced. Rail specifications are good. The local maker booked 2,000 tons of light rails in the week. Some makers report they have all the business they can handle in small spikes, but the market on standard spikes is quiet. We quote standard Bessemer rails as follows, the base price for open-hearth rails being $30, mill:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails on base weight of 40 to 45 pounds, $28, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.75c to 1.80c, Pittsburg; hand spikes, 1.80c to 1.85c, Pittsburg.

Steel.—Open-hearth steel continues very much in demand and is quite scarce, particularly small billets. Consumers of steel have been taking out their full quotas on contracts and are buying excess needs in the open market. Other large steel companies than those whose buying of steel has been commented upon, have been entering the market and some are reported now to be sounding the situation. Open-hearth steel prices as a consequence are very strong. The supply of free Bessemer billets is more in evidence than in open-hearth, which is due in a large measure to the less active rail market, which has caused some rail mills to be put upon billets. There has been some buying this week of Bessemer billets upon the basis of $28, Pittsburg. Not a great deal of open demand in sheet bars is to be noted, but the market is very firm at the quoted prices.

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $28 to $28.50, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets from $30 to $31, Pittsburg. Forging billets are quotable at $32 to $33, Pittsburg. Sheet and tin bars are quoted at $28.50 to $29 at makers' mill, located within the $1 Pittsburg freight limits.

Hoops and Bands.—Makers of hoops who have been steadily booking an increased amount of new business now have the output of their mills sold for several months ahead. Orders being entered are of large aggregate and deliveries with important makers range from five to six weeks on cut hoops and about two months on miscellaneous sizes. The 1.60c Pittsburg price on hoops is well sustained as the market's minimum and it would probably require a very attractive order to shade this level. Bands are very firm at 1.50, and are moving freely with deliveries far behind. We quote the present market as follows:

Hoops in carload lots, 1.60c to 1.65c; in less than carload lots, 1.70c to 1.75c; bands, 1.50c to 1.55c, base, with net extras as per standard steel.

Merchant Bars.—A very fair amount of new business for second quarter needs is coming out in steel bars, but with the mills of some makers so heavily sold up, these interests are taking on few additional engagements. Users are specifying quite liberally against contract, although the movement this month is not as heavy as in December, when the influence of expiring low priced contracts was felt. Delivery periods are not being cut down and continue from about four to six months, according to sizes. Quotations of from 1.80c to 1.85c from Pittsburg warehouses are being made. The general price level of the market is 1.50c, but in the case of very desirable business and to some preferred customers, 1.45c is still being quoted. Bar iron demand is fair, especially in the western districts, and some of the car companies are specifying for large quantities. The Pittsburg price of 1.70c is well held. Makers of shafting report their plants running full with a good outlook. We quote the market as follows:

Common iron bars, 1.70c to 1.75c, Pittsburg; Bessemer and open-hearth steel bars, 1.45c to 1.50c; plow and cultivator, 1.45c to 1.50c; channels, angles, zees, tees, under 3-inch, 1.45c to 1.50c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.15c advance; less than 1,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Planished and machine straightened tire is 1.70c base; iron finished tire under 1½ by 1½ inches, 1.65c, both plus net extra on tire card; iron finished tire, 1½ by ½ and over, 1.50c, plus net extra on the steel bar card.

On cold rolled strip steel, with 1½ inches and wider, and 0.100-inch and thicker, we quote base prices for 100 pounds, $3.35 on hard, and $3.60 on soft, except in carload lots of one size, where the price is lower.

Structural Material.—Conditions surrounding the structural steel situation are unchanged. Inquiry is only fair, and comparatively little new business is being booked. There has been no notable improvement in deliveries. A fair amount of new business is in sight. Shapes in small lots are being

sold at 1.80c from stock. The Jones & Laughlin Steel Co. will supply 400 tons for "Castle Gould," the new home of Howard Gould at Port Washington, Long Island. Bids went in on Jan. 18 for 500 tons to be used in the new Eighteenth regimental armory, this city. Bids will be invited in a few days by the county commissioners of Venango county, Pa., for a new bridge across the Allegheny river at Oil City, Pa., which will require about 2,000 tons. Approval of plans by the secretary of war for the proposed bridge across the Ohio river at Parkersburg, W. Va., means that work on the new structure will be started shortly by the Parkersburg Bridge Co. About 3,000 tons will be required. The Davenport Locomotive Works, Davenport, Ia., has awarded a contract for 600 tons to the McClintic-Marshall Construction Co. Price conditions in shapes appear to be stronger in the middle west and west than in the east, where desirable business is reported to be drawing out some concessions. Other structural material contracts which have been pending for some weeks likely will be awarded soon. We quote present shape prices as follows:

Beams and channels, 15-inch and under, 1.55c to 1.60c; over 15 inches, 1.65c to 1.70c; zees, 1.55c to 1.60c; tees, 1.55c to 1.60c; angles, from 3 to 6 inches, 1.55c to 1.60c; over 6 inches, 1.55c to 1.70c; universal and sheared plates, 6¼ inches wide and wider, 1.55c to 1.60c.

Merchant Pipe.—The Wichita Natural Gas Co. is in the market for about 20 miles of 6, 8, 12 and 18-inch steel pipe for a gas line in western districts. Other line projects, including the large enterprise of the Arkansas Natural Gas Co., are still in course of development. Jobbers' needs in pipe are being met largely from stocks on hand, and the ordering movement is not very active at present. On new requirements some makers are manifesting a willingness to cover the trade over the first quarter. Usually forward selling has been limited to thirty days. The Youngstown Sheet & Tube Co. expects to have in operation by March 1 its new furnace, which will have a capacity for making o. d. pipe up to 20 inches. We quote the following official discounts on card weight pipe in carload lots, subject to the usual additional discounts to the largest buyers, merchant pipe where specified being furnished from ⅛ to 6 inches and in plugged and reamed lots.

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	70	54	65	..
⅜ inch	71	57	66	52
½ inch	74	62	69	57
¾ to 6 inch	78	68	73	63
7 to 12 inch.....	72	57	67	52
13 to 15 inch	51½	..	..	..
PLUGGED AND REAMED.				
1 to 4 inch	76	66	71	61
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch.....	63	51	58	46
½ to 4 inch	70	58	65	53
4½ to 8 inch	66	54	61	49
9, 10, 11 and 12 inch	59	47	54	42
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch	59	48	54	43

Boiler Tubes.—Business in boiler tubes which has been gradually improving has expanded to very satisfactory proportions to makers and the mills are running on favorable schedules. Considerable new power work and locomotive building are appearing, which is furnishing a good demand. While some concessions are sometimes made in competition, the price-list on boiler tubes showing the official discounts to the largest buyers is as follows:

	Steel.	Iron.
1 to 1½ inch	49	43
1¾ to 1¼ inch.....	61	43
2½ inch	63	48
2¾ to 5 inch.....	69	55
6 to 13 inch	60	43

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

Wire Products.—The market in wire products is pretty quiet, both in new buying and in orders against contracts. Buyers in this district are covered for their needs, some of them of the manufacturing trade, for first quarter and second half. The time is still early for the spring movement. There is some report of price variances in the market. We quote the market as follows, contracts with the jobbing trade being limited, usually to 60 days:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90; painted barb wire, jobbers' carload lots, $1.85; retailers' carload lots, $1.90; with 30c for galvanizing; plain wire to jobbers in carloads, $1.65, and to dealers in carloads, $1.70; polished staples, $1.85; galvanized staples, $2.15.

Wire Rods.—There has been no recent buying of rods in this territory since several large contracts were made sometime ago on a basis of $33, Pittsburg, for Bessemer material. Users are well covered. We quote the market at $33 and $34, Pittsburg, on Bessemer and open-hearth rods.

Coke.—The coke market continues easy and very quiet, with some soft spots appearing which apply largely to the small operators who, having held out for high prices, are now showing more anxiety to sell. The larger makers producing first class Connellsville brands, having their first half outputs well under contract, are in a more secure position and are not forcing the market. The general level of the market on high-grade Connellsville furnace coke for January is about $2.60, ovens, to consumers, though on accumulated coke lower prices have been made in the trade. Middlemen are enabled to pick up good brands at $2.50 to $2.55, ovens. Contract prices on standard Connellsville furnace coke are nominal, as no business is being placed. The foundry coke market is also very dull and prices for spot shipment are easy. Grades other than strictly first class, Connellsville foundry coke, have been offered to brokers down to $2.70, oven. Water and labor conditions, while still somewhat varied, especially the latter, show improvement. We quote standard Connellsville furnace coke at from $2.60 to $2.70, ovens, for prompt shipment to consumers, and from $2.70 to $2.75, ovens, on contract. On first class Connellsville foundry coke we quote from $3.05 to $3.15, ovens, for prompt and from $3.25 to $3.35, ovens, on contract. The *Courier's* figures for the week ending Jan. 8 show 36,286 ovens active, with an output of 454,007 tons, compared with 36,272 active ovens and a production of 449,082 tons the previous week.

Old Material.—Buyers of old material in the Pittsburg territory having bought in sufficient quantities at the year-end movement to tide themselves over the next several months, are in a very apathetic state as regards the present market. Current buying is very light, and as it is dominated largely by lots which are obliged to be moved, conditions are rather soft. Some small lots of heavy steel are being put through and where they have not been forcing the market, very fair prices have been realized. Wrought scrap is less of a drag upon the market than other grades. Dealers are finding little demand for cast and borings and turnings are also very dull. Bundled sheet scrap continues weak. Dealers are having difficulty in getting low phosphorus material to cover pending inquiry. We quote gross tons delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$17.50 to 17.75
Rerolling rails	18.50 to 19.00
Bundled sheet scrap	15.00 to 15.50

Iron axles	27.00 to 27.50
Old iron rails	19.50 to 20.00
No. 1 wrought scrap	19.00 to 19.25
Old car wheels	17.00 to 17.50
Low phosphorus	21.50 to 22.00
Machine shop turnings	13.00 to 13.50
Cast borings	10.75 to 11.25
No. 1 cast scrap	16.50 to 17.00
Malleable	16.50 to 17.00
Stove plate	14.00 to 14.50

CHICAGO

Good Tonnage of Rails Sold—Numerous Bridge Contracts Pending.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Jan. 18.

General conditions in the Chicago market for finished material are fully as good as could be expected at this season of the year. In some lines, January and February are always marked by a quietness in demand. While the present year is no exception, the lull in business is rather less pronounced than in other years. Rail sales have been fairly heavy the past week, the local interest booking some 40,000 tons of standard rails. The structural contracts originating in Chicago and western territory amounted to nearly 5,000 tons in the past week and there is a large amount of business nearly ready to be closed and a very considerable tonnage in prospect. Contracts for bridge material amounting to between 10,000 and 20,000 tons will be closed before Feb. 10. The iron and steel trade is just beginning to recover from the paralysis of road traffic caused by the long continued snow and freezing weather, which has made it absolutely impossible to keep an adequate supply of coal and coke moving for furnaces and other interests. This has been a very serious handicap to business and has resulted in a very material financial loss to many firms.

Pig Iron.—The pig iron market may be described as being in a rather hesitating state. This refers more particularly to the establishment of prices than to trade conditions in general, as there has been during the past week quite a little inquiry and a very fair tonnage figuring in the actual sales. The interruption to railroad business by the severe weather is still being felt, although the worst of the difficulty is over with the advent of milder weather. In a few days, shipments may be expected to resume their normal condition, but in the meantime the trade has suffered very seriously through the delay in shipments of coke and pig iron.

Buyers are beginning to reach out further into the year and inquiries for the third and last quarters of 1910 are becoming more and more numerous. As before stated, there is some uncertainty of feeling in regard to prices, and as is frequently the case, much of the blame for concessions is laid at the door of the southern Ohio furnace interests, whether altogether justly or not, it is difficult to determine.

Some of the local furnace interests, and those in territory adjacent to Chicago, are protesting against the new freight tariff, effective Feb. 1, on shipments of pig iron originating in territory east of the Indiana-Illinois line as far as Pittsburg and Buffalo, inclusive, and destined for Mississippi river and Freeport groups, and territory as far north as Dubuque. The new rate is $3.10 per ton from Youngstown common points, as against the present rate of $3.80. The interests located in territory adjacent to Chicago claim that this reduced rate would work an injustice to them, and that if the tariff is kept in force, the rate on pig iron from Chicago common points to Mississippi river points must be reduced to $1 per ton.

While there are some persistent rumors of No. 2 foundry being sold for less than $14, Birmingham, there seems to be no well authenticated cases in which this has been done. Such reports oftentimes arise from sales of off-grade or special analysis iron, and by the clever juggling of figures, the price of standard foundry iron is made to appear lower than the conditions warrant. At present the $14 price can be done for the first half of this year, although some interests are asking 25 cents advance for the second quarter of the year and 50 cents advance for the last half of the year. We quote:

Lake Superior charcoal	$19.50 to 20.00
Northern foundry No. 2	19.00 to 19.50
Southern foundry No. 2	18.35 to 18.85
Southern silveries, 5 per cent silicon	19.40 to 19.90
Jackson Co. silveries, 8 per cent.	22.40 to 22.90
Malleable Bessemer	19.00 to 19.50
Alabama basic	18.85 to 19.35

Billets.—The billet situation is absolutely unchanged and at present there is no prospect of immediate relief from the shortage which has existed for many weeks. Consumers in this district would be willing to pay almost any price for steel, if it were available. Manufacturers of billets in this territory are sold ahead and it is only occasionally that outside markets can spare steel to relieve the tension in the Chicago district. Prices, as heretofore, are merely nominal and depend upon the necessities of the buyer.

Merchant Bars.—The bar market is strong, notwithstanding the fact that the new year demand has not yet reached a very heavy rate, but prices are firmly held at previous quotations, and local mills have considerable business on their books. The Cincinnati, Hamilton & Dayton road has bought 1,500 freight cars, the order being distributed equally between the Cambria Steel Co., the Pressed Steel Car Co., and the Ralston Car Work at Columbus, O. The same line has purchased 1,000 steel underframe cars from the American Car & Foundry Co.

We quote Chicago delivery, as follows:

Bar iron, 1.60c to 1.65c; hard steel bars, re-rolled, 1.60c to 1.65c; soft steel bars and bands and small shapes, 1.68c to 1.78c base; hoops, 1.78c to 1.88c; planished or smooth finished tire steel, 1.88c to 1.93c; iron finish, up to 1½ x ½ inch, 1.83c base, tire card; iron finish, 1½ x ½ inch and larger, 1.68c, base, bar card; channel for solid rubber tires, ¾ to 1 inch, 2.18c, flat, and 1⅛ inches and larger, 2.08c, flat; smooth finished machinery steel, 1 inch and larger, 2.43c; flat sleigh shoe, 1.73c; toe calk steel, 2.23c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 55 per cent off the list for carload lots, and 50 per cent off for less than carload lots, carload freight allowed to points in base territory.

On iron and steel bars from local stocks, we quote, as follows: Bar iron, 2c to 2.10c, base; soft steel bars, 1.90c to 2c per 100 pounds base; soft steel hoops, 2.40c to 2.50c, full extras.

Structural Material.—Contracts for between 4,000 and 5,000 tons for the western market were closed last week. This market continues to be one in which there is the highest pressure, and in spite of the fact that fabricating shops and structural mills are very badly behind in their orders, new business continues to be taken, the delivery in each new contract naturally being further deferred than that on previous contracts. The total amount of structural material contracted for all over the country last week was 18,000 tons, of which the leading interest took about 8,000 tons. There are prospects in sight for a large tonnage and also an equally large tonnage of actual business, which awaits the final closing of the deals. The Plew building, in this city, has been let to the Union Foundry Works and the amount of steel reduced to 320 tons, Bethlehem shapes being specified. The Wisconsin Bridge Co., of Milwaukee, took a contract for a draw-span for the Great Northern Railway requiring 360 tons of material. The Metallurgical

School building, at the School of Mines, Golden, Colo., went to the M. J. Patterson Construction Co., Denver, Colo., 225 tons. The material for the Memphis Cotton Exchange, 2,600 tons, will be fabricated in the Memphis shops of the Virginia Bridge & Iron Co. The car shops of the American Car & Foundry Co., at St. Charles, Mo., 800 tons, went to the Kenwood Bridge Co..

We quote mill prices for structural shapes, Chicago delivery, as follows:

Beams and channels, 15-inch and under, 1.78c to 1.88c. For extras see Pittsburg report.

Local store prices are as follows: All angles, 3 inches and larger, including 6 inches, $2 to $2.10 per 100 pounds; angles over 6 inches, $2.10 to $2.20 per 100 pounds base; beams, 3 to 15 inches, inclusive, $2 per 100 pounds base; channels, 3 inches and larger, $2 per 100 pounds base.

Rails and Track Supplies.—The leading interest made sales during the past week of 40,000 tons of standard rails, 11,500 tons of which were open-hearth. The Harriman lines took 3,500, the M., K. & T. took 14,000 and 22,000 tons were part of a deal which has been open for some time, an eastern road being the buyer.

See Pittsburg report for prices on standard sections.

On light rails, Chicago delivery, we quote as follows: Light rails, 40 and 45-pound, $26.30, and 35-pound, $26.75.

Plates.—There has been very little if any diminution in the stream of business which has been coming in to the mills, and order books are very well filled up. The outlook for a continuance of the good conditions which have existed so long, are very bright.

We quote, Chicago delivery, as follows: Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.78c to 1.88c. For extras see Pittsburg report.

Store quotations are without change as follows: Tank steel, ¼ inch and heavier up to 72 inches wide, 2c to 2.10c; from 72 inches to 96 inches wide, 2.10c to 2.20c; 3/16 inch up to and including 60 inches wide, 2.10c to 2.20c; 72 inches, 2.35c to 2.45c; No. 8 up to 60 inches wide, 2.15c to 2.25c. Flange and head quality, 25c extra.

Sheets.—A very promising future is in sight for this market, as there is sufficient business in hand and in prospect to assure steady operation of the local mill, for weeks. No attempt has been made to advance prices, although they are considered low when compared with the advanced ruling on other material.

For mill prices see Pittsburg report. Freight to Chicago, 18 cents.

We quote store prices at Chicago as follows: No. 10, 2.25c to 2.35c; No. 12, 2.30c to 2.40c; No. 14, 2.35c to 2.45c; No. 16, 2.45c to 2.55c; Nos. 18-20, 2.80c to 2.90c; Nos. 22-24, 2.85c to 2.95c; No. 26, 2.90c to 3c; No. 27 2.95c to 3.05c; No. 28, 3c to 3.10c; No. 30, 3.30c; galvanized sheets, Nos. 10 and 16, 3.20c to 3.30c; Nos. 18 and 20, 3.35c to 3.45c; Nos. 22 to 24, 3.50c to 3.60c; No. 26, 3.50c to 3.80c; No. 27, 3.90c to 4c; No. 28, 4.10c to 4.20c; No. 30, 4.50c to 4.60c.

Wire Products.—Demand for wire goods is seasonably good, and as spring draws nearer, it is expected that a very large expansion of trade in this line may be expected with confidence. Prices are unchanged.

We quote, Chicago delivery, as follows: Wire nails, jobbers' carload lots, $2.03; retailers' carload lots, $2.08; retailers' less than carload lots, $2.18; painted barb wire, jobbers' carload lots, $2.03; retailers' carload lots, $2.08; retailers' less than carload lots, $2.18; with 30c for galvanizing; plain wire to jobbers, carload lots, $1.83; staples, bright, $2.03.

Merchant Pipe and Tubes.—Considering the season, the amount of business being handled in this line in the western market is as large as can be expected, as January and February are usually light months. Construction work on the new pipe plant of the Republic Iron & Steel Co., at Youngstown, O., is making such good progress that it is expected that the mill will be in operation in April.

For mill discounts, see Pittsburg report.

We quote, out of store, as follows: Wrought steel pipe, black ⅛-inch to ¼-inch, 68 per cent; ⅜-inch, 69 per cent; ½-inch, 72 per cent; ¾-inch to 6-inch, 76 per cent; 7-inch to 12-inch, 68 per cent. Iron pipe about 6 points higher.

Lap-welded steel tubes, 2¾-inch to 5-inch, 60 to 62 per cent; charcoal iron tubes, 2¾-inch to 4-inch, 48 to 50 per cent; seamless steel tubes, 2¾-inch to 4-inch, 46 per cent.

Cast Iron Pipe.—The past week was a very quiet one in the cast iron pipe market. The city of Chicago will open bids on Feb. 2, on 5,700 tons of pipe, and this is the only municipal letting in sight.

We quote as follows: 4-inch water pipe, $28.50; 6 to 16 inches, $27.50; larger sizes, $26.50; gas pipe, $1 a ton higher.

Old Material.—The market for old material is still inactive and there is absolutely no movement of scrap either from the country or from the railroad stocks. There is some little demand for cut forge and No. 2 wrought and the feeling in No. 1 cast is quite firm, owing somewhat to the fact that shipments of pig iron have been delayed, making it necessary, in some cases, to fall back on the scrap piles for supplies. We quote:

Old car wheels	$18.00 to 18.50
Old iron rails	19.50 to 20.00
Rerolling rails (4 ft. and over)	17.75 to 18.25
Old steel rails (2 ft. and under)	17.00 to 17.50
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	16.00 to 16.50
Heavy melting steel	16.00 to 16.50
Shoveling steel	15.00 to 15.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.75 to 15.25
No. 2 R. R. wrought	13.75 to 14.25
Arch bars and transoms	17.75 to 18.25
Knuckles, couplers and springs	14.25 to 14.75
Shafting	17.50 to 18.00
Iron car axles	21.25 to 21.75
Steel car axles	20.50 to 21.00
Locomotive tires	18.00 to 18.50
Dealers' forge	12.25 to 12.75
Pipes and flues	11.25 to 11.75
No. 1 cast, 150 lbs. and less	15.00 to 15.50
No. 1 busheling	12.75 to 13.25
No. 2 busheling	9.50 to 10.00
No. 1 boiler cut	11.25 to 11.75
Boiler punchings	16.00 to 16.50
Cast and mixed borings	7.50 to 8.00
Machine shop turnings	10.50 to 11.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	13.25 to 13.75
Stove plate and light cast scrap	12.25 to 12.75
Angle bars, splices, etc. (iron)	17.25 to 17.75
Angle bars, steel	15.50 to 16.00

CLEVELAND.

Heavy Sales of Ore—Numerous New Building Projects.

Office of THE IRON TRADE REVIEW,
Browning Building, Jan. 18.

Iron Ore.—Sales of non-Bessemer ore have continued at a very satisfactory rate, and it is now estimated that sales of Bessemer and non-Bessemer ores to interests outside of the United States Steel Corporation amount to between 15,000,000, and 16,000,000 tons. This includes practically all the Bessemer ore available and a large percentage of the non-Bessemer ores.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20, and Mesabi non-Bessemer, $4.

Pig Iron.—While sales and inquiries in the city of Cleveland have not been heavy, reports from cities not far distant, particularly in western New York and northwestern Pennsylvania, indicate that a large tonnage is pending. Some of the heaviest buyers, including malleable, pipe and pump companies, are inquiring for large tonnages. In some cases, the inquiry is for last half delivery, and a rather

surprising development has been the willingness of one or two interests to quote the same price for that delivery as for first half. Other interests are asking 50 cents per ton more for the last half than for the first half. Some southern iron is being sold in this territory at $14, Birmingham, for No. 2. We quote delivered in Cleveland as follows:

No. 1 foundry	$ 18.40
No. 2 foundry	17.90
No. 2 Southern	18.35
Gray forge	17.15 to 17.40
Bessemer	19.90
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.55

Coke.—The market is perhaps a shade easier for prompt delivery for foundry grades, but with this exception no change is noticeable. For prompt delivery, we quote Connellsville furnace coke at $2.60 to $2.75, and for contract $2.75 to $2.80. Foundry coke is quoted at $3.10 to $3.25 for prompt and $3.25 to $3.40 for first half.

Finished Materials.—While specifications are of course not as heavy as they were during the last few weeks of the old year, there is nothing to indicate any change from conditions of great prosperity. In a few instances, perhaps, consumers specified more heavily than necessary, and a small tonnage of resale product has been available, but this tonnage is not of such amount as to have any important effect on conditions. Premiums are still being paid for prompt delivery. The congestion in steel bars continues, and on rounds and squares below 2 inches delivery is extremely slow. Contracts for steel bars are being made by the leading interest for the first quarter and by other interests for the first half and the prevailing price is 1.50c Pittsburg.

The Nickel Plate Railroad has ordered 1,000 box cars from Haskell & Barker, Michigan City, Ind., and 1,000 gondolas from the Hicks Car & Locomotive Works, Hammond, Ind. The Toledo & Ohio Central has ordered 1,000 50-ton gondolas from the Ralston Steel Car Co., Columbus, Ohio.

Inquiries for two lots of plates, one for 1,000 tons and one for 1,500 tons for tank makers in the Mahoning valley are pending. There is some inquiry for forging billets and one company is asking $33.

It is expected that work will be gegun immediately on the tearing down of old buildings on the site for the proposed addition to the Rockefeller building, and the contract will soon be awarded for the structural steel required, amounting to about 1,000 tons. The Peerless Motor Car Co. is about to award a contract for 600 to 700 tons of structural material for an addition to its plant. Other contracts being figured on are the Swetland building on Euclid avenue, 1,200 tons, and the Priscilla theatre on East Ninth street, about 200 tons. The Goodyear Rubber Co., Akron, O., has let the contract for an addition to its plant, dividing the steel between the Cambria Steel Co. and T. H. Brooks & Co., Cleveland. A contract for from 400 to 600 tons of shapes for the Erie Engine Works, Erie, Pa., is about to be considered.

Old Materials.—The movement of scrap iron in this district continues to be so small as to justify no change in existing quotations. The increased activity in cast scrap continues, and the market is probably stronger in that branch than it has been for several weeks. We continue to quote f. o. b. Cleveland as follows:

Old iron rails	$20.00 to 20.50
Old steel rails (under 6 feet)	17.00 to 17.50
Old car wheels	17.50 to 18.00
Old steel boiler plate	14.00 to 14.50
Malleable iron (railroad)	17.00 to 17.50
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	15.00 to 15.50
Heavy steel	16.25 to 16.75
Country mixed steel	14.00 to 14.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$16.00 to 16.50
No. 1 busheling	14.00 to 14.25
No. 1 machine cast	15.00 to 15.50
Axle turnings	11.00 to 11.50
Machine shop turnings	10.50 to 11.00
Grate bars	12.50 to 13.00
Pipes and flues	12.00 to 12.50
Tank iron	11.50 to 12.00
Sheet iron	6.50 to 7.00
Wrought drilling	10.50 to 11.00
Stove plate	12.00 to 12.50
Cast borings	8.50 to 9.00

NEW YORK.

Foreign Ore Arrivals Heavy, But Little Buying—Large Pig Iron Inquiry.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Jan. 18.

Iron Ore.—Arrivals of foreign ore have been extremely heavy during the past week. The port at New York is now discharging six or seven vessels in good shape, but at Philadelphia the berths are filled and several vessels are anchored in the river waiting their turn. No further sales of foreign ore are reported, as the situation abroad has taken on unusual strength and prices have firmed sharply.

Pig Iron.—Through the eastern district inquiry is steadily broadening and among those now negotiating for iron are several large consumers which are attempting to buy for forward delivery. The General Electric Co., for instance, has inquiries out for 8,000 tons, delivered over the last half, and one local house reports that it is figuring on an aggregate of fully 50,000 tons, including foundry, coke malleable, pipe iron, charcoal and low phos. No large blocks have been closed during the week, but a very fair tonnage was disposed of in small lots and there is every indication that this iron is going directly into melt, as requests for anticipated shipments are still numerous and complaint is immediate in case furnaces do not keep up with schedules. A stack may be put out at Riddlesburg for relining, but no other furnace tonnages are reported or anticipated. The blizzard of last Thursday caused little inconvenience and no material interruption of furnace activities. The American Steel & Wire Co. has taken 4,000 tons of low phosphorus iron from the New York state maker for delivery at the rate of 1,000 tons per month from March until June. Other than this there has been no activity in the low phosphorus market, although a good inquiry is still before the trade. Coke prices are lower, particularly for spot and early shipment. We quote, delivered at eastern Pennsylvania plants over the remainder of the first half, as follows:

Northern foundry No. 1	$19.25 to 19.75
No. 2X foundry	19.00 to 19.25
No. 2 plain	18.50 to 19.00
No. 2 southern foundry	18.25 to 18.75
Malleable	19.50 to 20.00
Gray forge	17.50 to 18.00

Ferro-Alloys.—Only a scattering trade is noted, with sales of carlots on the levels heretofore reported, $44 to $45, seaboard, for ferro-manganese and $62 to $63, Pittsburg, for ferro-silicon. Manganese ores are somewhat higher and this, coupled with the prospect of improvement in the foreign steel trade, has revived predictions of an advance in the alloy.

Finished Materials.—Structural lettings of the week have included several attractive local building projects and aggregate a fair tonnage. The American Bridge Co. has secured an additional 2,500 tons through an extension of the New York Central's terminal plans in this city; Levering & Garrigues will employ Bethlehem sections in the theater and office building at Broadway and Forty-Third, 1,100 tons, being built by the C. L. Gray Construction Co.; and the Hinkel Iron Co. has taken the Dacorn Realty Co. apartment, New York City, 600 tons. Prices are being taken by the Geo. A. Fuller Co. as general contractor on about 1,500 tons of steel for the Pennsylvania Terminal postoffice; the Thompson-Starrett Co. will shortly let the steel contract for the Rector building, about 2,000 tons, and Post & McCord have secured the Heywood & Wakefield loft building,

3,500 tons. The Pennsylvania Railroad has inquiries out for some small bridges, involving about 400 tons of steel and the New Haven is taking prices on a 400-ton bridge at Providence. Another railroad project, though still rather remote, is the joint railroad bridge over the Ohio at Louisville, involving about 7,000 tons. The American Bridge Co. has just entered formal contracts for the St. Louis bridge, 14,000 tons, awarded about two months ago. The Pennsylvania Steel Co. is taking prices on some 6,000 or 8,000 of beams needed for the Municipal office building, but plans to supply the remainder of the steel itself and to fabricate the entire tonnage involved.

Open-hearth billets continue scarce in the east, though Bessemer material is available at $28.00, eastern mill, or even lower, provided good tonnages are involved. Bar iron is rather inactive, with prices ranging from 1.60c to 1.70c, eastern mill. There is still an absence of rail buying and no further export inquiries of importance have developed. We quote, New York delivery, as follows:

Angles, 3 to 6 inches x ¼-inch and heavier, 1.76c to 1.81c; beams, 3 to 15 inches, 1.76c to 1.81c; tees, 3 x ¼-inch and heavier, 1.76c to 1.81c; plates, carload, tank, 1.76c to 1.81c; marine boiler, 2.06c to 2.16c; bar iron, 1.70c to 1.80c; soft steel bars, 1.61c to 1.71c; sheets, No. 28, black, 2.46c.

Cast Iron Pipe.—A few scattered inquiries are developing from the New England district, but the market is feeling the effects of the quiet usual at this time of the year and no transactions of size are coming to light. Legal proceedings have been instituted in New Jersey to prevent the laying of pipes to supply Staten Island with water, and as a result the state will probably settle upon a definite policy in regard to the transportation of water beyond its limits.

Old Material.—Embargo conditions continue at practically all of the larger mills in the east and the movement of heavy steel is at a standstill as a result. Brokers are offering $17, delivered, for this material but are not securing much scrap. There is little accumulated in yards through this district, but stocks at consumption points are large and evidently are not being worked up as rapidly as anticipated. Railroad wrought is in fair demand, but cast scrap is weaker. About 2,000 tons of miscellaneous material is due shortly from Panama and 1,200 tons from Yucatan. We quote, gross tons, as follows, these being the prices which New York dealers are willing to pay:

Old steel rails (re-rolling)	16.00 to 16.50
Old car wheels	15.00 to 15.50
Old iron car axles	23.00 to 24.00
Old steel car axles	20.00 to 20.50
Heavy melting steel	14.75 to 15.25
No. 1 railroad wrought	17.50 to 18.00
Iron track scrap	15.00 to 16.00
Wrought pipe	13.50 to 14.00
Cast borings	9.50 to 10.00
Wrought turnings	11.50 to 12.00
Heavy cast scrap	15.00 to 15.50
Railroad malleable	14.00 to 14.50
Stove plate	11.50 to 12.00
Grate bars	12.00 to 12.50

CINCINNATI.

Buying Shows More Life—Interest in the Future.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Jan. 18.

Pig Iron.—The general situation is apparently unchanged, and the buying, while somewhat irregular, is good and firm, showing more life than for several months past. Consumers appear to be fairly well covered for immediate requirements and are beginning to show a little more interest in the future. Melters of the lower grades have bought considerable tonnage and while the supply of this iron is perhaps ample to meet all demands, there is said to be a small surplus, which will rapidly disappear. The market has shown considerable life throughout Chicago territory, and a number of malleable concerns have been heavy buyers during the past week or two. This is in a measure true of northern and central Ohio iron, and while the buying has been in a much smaller way, the general activity developed has been of a healthy character and the aggregate of iron sold has been considerable. Reports from Indiana territory show the situation to be quiet, with inquiries light and irregular. The labor situation, so far as respects molders, appears to be quite a factor in the general situation, and is held to be responsible in a number of instances for melters failing to take a more lively interest in the quotations of today. Prices are holding strong at $14, Birmingham, for southern, and $17, Ironton, for northern, with a limited number of sales at a slight advance over these quotations for last half delivery. A large malleable concern in western territory bought 3,000 tons, while numerous small sales, ranging from 100 to 500 tons, have been quite common. The general opinion prevails that the next week or two will continue to show an increased buying movement, and that while the individual tonnage may perhaps be along comparatively quiet lines, the aggregate will give an impetus to the situation in general that will be very beneficial. We quote, for prompt delivery and for delivery over the first quarter of 1910, based on freight rates of $3.25 from Birmingham, and $1.20 from Ironton, as follows:

Southern foundry No. 1	$17.75 to 18.25
Southern foundry No. 2	17.25 to 17.75
Southern foundry No. 3	16.75 to 17.25
Southern foundry No. 4	16.75 to 17.00
Southern No. 1 soft	17.75 to 18.25
Southern No. 2 soft	17.25 to 17.75
Southern gray forge	16.50 to 16.75
Northern No. 1 foundry	18.70
Northern No. 2 foundry	18.20
Northern No. 3 foundry	17.70
Jackson county 6 per cent silicon	20.20
Jackson county 8 per cent silicon	21.20
Jackson county 10 per cent silicon	22.20

Coke.—The market for this commodity is slightly more active and producers are shipping in a very satisfactory manner. Prices have changed slightly, but are somewhat irregular and fluctuating. Weather conditions have changed for the better and suspense from that source has disappeared. Prices in the leading coke producing districts are as follows:

	Prompt shipment.	First half 1910.
Connellsville district:		
Foundry coke	$3.00 to 3.25	$3.00 to 3.25
Furnace coke	2.65 to 2.75	2.75 to 3.00
Wise county district:		
Foundry coke	2.75 to 3.00	3.00 to 3.25
Furnace coke	2.10 to 2.25	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	2.75 to 2.90	2.85 to 3.10
Furnace coke	2.50 to 2.75	2.75
New River:		
Foundry coke	2.75 to 3.25	2.90 to 3.25
Furnace coke	2.35 to 2.50	2.50 to 2.60

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16⅔ per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Old Material.—Dealers report things as very quiet, with no signs of any change. Demand appears to be at low ebb and a general state of dissatisfaction prevails. Dealers' prices here are said to be as follows:

Old No. 1 R. R. wrought, net tons	$13.50 to 14.00
No. 1 machinery, net tons	13.50 to 14.00
No. 1 busheling, net tons	13.00 to 13.50
Old iron rails, gross tons	18.00 to 18.50
Old steel rails (re-rolling), gross tons	17.00 to 17.50
Old short lengths, gross tons	15.50 to 16.50
Old iron axles, net tons	19.00 to 19.50
Heavy melting scrap, gross tons	14.50 to 15.00
Stove plate net tons	10.50 to 11.00
Heavy turnings, net	9.50 to 10.00
Cast borings, net tons	8.50 to 9.00
Car wheels	15.50 to 16.00
Grate bars	12.00 to 12.50

ST. LOUIS.

Very Little Selling, but Tone of the Market is Good.

Jan. 17.

Pig Iron.—Optimism pervades the pig iron market and its allied industries in the St. Louis territory, although it must be admitted there is very little actual business to justi-

fy such feeling. One sale of 1,000 tons of southern No. 2 was made this morning at $14, for delivery over the first half and quarter; inquiries are out for quite a number of small lots, totalling probably 2,000 tons of southern No. 2, also one inquiry for 500 tons each of No. 1, 2 and 3, analysis to accompany invoice and shipments to be made over the third quarter. No. 2 is quoted at $14, Birmingham basis, for first quarter, and generally at $14.50 for first half. Considerable interest is manifested in what can be done for third quarter shipment, one agent insisting that he could have sold a considerable tonnage for that delivery, but was not permitted to do so. Ohio iron is firm at $17, Ironton, for first half delivery.

It is believed that the conditions that prevailed last week will show an improvement this week and that as the month passes away and stock-taking ceases business will open in earnest. Steel and malleable plants throughout the St. Louis territory are running to their full capacity.

Our prices for southern iron, delivered, to which the Birmingham freight of $3.75 has been added, follow:

No. 1 foundry	$ 18.25
No. 2 foundry	17.75
No. 3 foundry	17.25
No. 4 foundry	16.75

Coke.—The demand for coke is by no means brisk, but agents are quite confident a decided improvement will manifest itself before the month closes. The minimum price on Connellsville 72-hour foundry coke is $3 to $3.50 for first half shipment, and $3.25 for prompt delivery. Connellsville 48-hour furnace grades are offered at $2.50 to $3 for prompt delivery. The price on Virginia foundry is $3 to $3.25 for prompt, and $3.25 to $3.50 for future shipment. These prices are f. o. b. ovens, in all instances, with a freight rate of $2.80 to East St. Louis and St. Louis, and $2.70 from the Virginia fields, when shipment is destined beyond St. Louis.

By-product is firm at $5.80, St. Louis.

Old Material.—The mills are well supplied with scrap iron, and there is practically no demand, but prices are unchanged, as follows:

Old car wheels	$17.00 to 17.50
Old iron rails	19.00 to 20.00
Rerolling rails (4 ft. and over)	16.75 to 17.25
Old steel rails (2 ft. and under)	16.50 to 17.00
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	15.50 to 16.00
Heavy melting steel	15.50 to 16.00
Shoveling steel	14.00 to 14.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.50 to 15.00
No. 2 R. R. wrought	13.50 to 14.00
Arch bars and transoms	17.50 to 18.00
Knuckles, couplers and springs	15.00 to 15.50
Shafting	17.00 to 17.50
Iron car axles	20.00 to 21.00
Steel car axles	20.00 to 21.00
Locomotive tires	18.00 to 18.50
No. 1 country wrought	12.25 to 12.75
Pipes and flues	11.75 to 12.00
No. 1 cast, 150 lbs. and less	14.00 to 14.50
No. 1 busheling	13.00 to 13.50
No. 2 busheling	9.75 to 10.25
No. 1 boiler cut	11.50 to 12.00
Boiler purchings	13.00 to 14.00
Cast and mixed borings	7.50 to 8.00
Machine shop turnings	10.75 to 11.25
Railroad malleable	13.25 to 13.75
Agricultural malleable	11.50 to 12.00
Stove plate and light cast scrap	11.50 to 12.50
Angle bars, splices, etc. (iron)	17.25 to 17.75
Angle bars, steel	15.50 to 16.00

BUFFALO.

Heavy Inquiry, but Little Actual Buying—Interest in Last Half.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Jan. 18.

Pig Iron.—There is a lull in actual buying of pig, believed to be merely temporary. The reason assigned is the fact that some of the principal consumers in this territory are employing only 75 per cent of their working force. There is good reason now to believe that in two months this phase will be removed. This is based on the indications of price and activity at manufacturing plants in this vicinity. About 60,000 tons are under inquiry here now, and much of the interest is in second quarter and last half. The interest in last half is developing rapidly. Shipments are moving out unusually rapidly for this period of the year. We quote f. o. b. Buffalo, for first half deliveries as follows:

No. 1X foundry	$17.75 to 18.00
No. 2X foundry	17.25 to 17.50
No. 2 plain	17.00 to 17.25
No. 3 foundry	17.00 to 17.25
Gray forge	16.75 to 17.00
Malleable	17.25 to 18.25
Basic	18.25 to 18.75
Charcoal	20.50 to 21.00

Finished Products.—Specifications come out slowly on new business. There is little activity, but indications point to good business and it is generally thought that the early spring will bring out a lot of orders. In Buffalo there are a number of good tonnage prospects under cover and it is said they may come out through specifications soon. The motor company at Syracuse, which has been figuring on a large structural tonnage, has not decided as to its needs. In the same city there are two projects involving about 400 tons, one being the Dunn-Salmon Co., and the other the McCarthy estate, both office buildings. Deliveries on bars are reported three to four months behind, but on heavier sizes better delivery may be had. Structural sections are from six to eight weeks behind, and plates three months. Buffalo is generally quoting $1.50, Pittsburg, on bars. This price is firm. Shapes and plates run 1.60c, Pittsburg base. It is said that on big tonnages the price is shaded, especially in the matter of plates, in which case 1.55c has been accepted on large orders.

Old Material.—This market drags along without notable change in either direction. It is dull and indifferent. Dealers who are heavily stocked are patient and hopeful, but the call is scattering and light. Prices quoted are only nominal. It is understood that in some cases they may be shaded, depending on the grade of material and tonnage desired. We quote gross tons, f. o. b. Buffalo, as follows:

Heavy melting steel	$16.25 to 16.75
No. 1 railroad wrought scrap	18.25 to 18.75
No. 1 railroad and machine cast scrap	16.50 to 17.00
Old steel axles	21.00 to 21.50
Iron axles	26.00 to 26.50
Car wheels	18.00 to 18.50
Railroad malleable scrap	17.00 to 17.50
Machine shop turnings	11.75 to 12.25
Cast iron borings	9.25 to 9.75
Low phosphorus steel scrap	21.00 to 22.00
Old iron rails	20.00 to 21.00
Tank iron	14.00 to 14.50
Sheet iron	9.00 to 9.50
Stove plate	13.75 to 14.25
Pipe and flues	14.00 to 14.50
Grate bars	13.00 to 13.50
Boiler plate	14.50 to 15.00

PHILADELPHIA.

Pig Iron Sales Make Good Aggregate in Spite of Dullness in Foundry Grades.

Pig Iron.—The most interesting development of the week was the sale of a round tonnage of third quarter basic at $18.75, delivered. A plate works in this district came into the market and closed for 15,000 tons at this figure. Through a local selling interest, the order being divided between two Schuylkill valley producers. Some additional tonnage was secured from another maker on similar terms, and it is understood that in all about 20,000 tons was taken on, this being all that will be purchased by this interest for the present. For delivery ahead of the third quarter, basic iron is scarce and furnaces refuse to consider concessions. The New York producer of low phosphorus iron has made a number of good sales, including one of 4,000 tons to a Corporation interest, for western shipment, on a basis of $23, eastern Pennsylvania delivery, chiefly for the first quarter. In all, this business amounts to about 9,000 tons, and an 800-ton sale by a Pennsylvania maker brings the total of low phosphorus transactions recently closed in this district up to about 10,000 tons. Pipe foundries have purchased considerable

iron during the week and are in the market for further substantial lots. There has been a decided scarcity of foundry business, but even without activity in that line, total sales of the week in this district have aggregated between 30,000 and 35,000 tons. The heavy snowfall caused no material interruption of operations. Prices continue firm, with the exception that some little shading is current in foundry grades. The Eastern Pig Iron Association meets in this city Wednesday. We quote, delivery at eastern Pennsylvania plants over the first half, as follows:

No. 1X foundry	$19.25 to 19.75
No. 2X foundry	18.75 to 19.25
No. 2 plain	18.25 to 18.75
Standard gray forge	17.75 to 18.25
Basic	18.75
Low Phosphorus	22.75 to 23.25
No. 2 Birmingham	18.50 to 19.00
No. 2X Virginia	19.50 to 20.00
No. 2 plain Virginia	19.00 to 19.50

Finished Materials.—The effect of the holiday slowing up in new business is evident in certain quarters, as better deliveries are procurable from both plate and structural mills in this district and on attractive business the 1.55c, Pittsburg, price is still being done. There is some complaint over the continued absence of buying by the railroads, which so far this year have done less than in the closing months of 1909. Structural materials are quiet, the only letting of importance reported being about 500 tons for the McCall school in this city, to be furnished by the Jones & Laughlin Steel Co. Figures are being taken on the steel for a manual training high school at Newark, and there is renewed activity in the Mauran apartment project locally, involving about 1,500 tons. We quote, Philadelphia delivery, as follows: Structural shapes, 1.70c to 1.80c; plates, 1.70c to 1.80c; steel bars, 1.60c to 1.70c; bar iron, 1.70c to 1.80c; open-hearth billets, $30.60.

Old Materials.—There is apparently a little better tone to the heavy steel market, though conditions show little improvement so far as embargoes are concerned. Dealers who are covering short sales are securing no material at $17, delivered, but are picking up some good blocks at $17.50. Rerolling rails are weaker, though mills are operating steadily, the decline being due chiefly to unusually heavy offerings. We quote, gross tons prices which will be paid for delivered material at eastern Pennsylvania plants, as follows:

Old steel rails (rerolling)	$18.00 to 18.50
No. 1 steel scrap	17.25 to 17.75
Old car wheels	17.00 to 17.50
Old iron car axles	29.00 to 30.00
Old steel car axles	23.00 to 24.00
No. 1 railroad wrought	18.50 to 19.00
Wrought pipe	17.00 to 17.50
Cast borings	12.75 to 13.25
Wrought turnings	14.75 to 15.25
Heavy cast scrap	17.25 to 18.00
Railroad malleable	16.75 to 17.25
Stove plate	13.00 to 14.00

BIRMINGHAM.

Pig Iron Makers Slow to Quote on First Half Business.

Jan. 18.

Satisfactory sales of pig iron were made during the week just closed, and a canvass of the situation shows a much better spirit prevailing in iron circles. Several sales were made on a basis of $14 per ton at the furnace for first quarter and prompt shipment, but for first half business all interests are slow in quoting, rather being inclined toward $14.50. While this base price did not prevail during the first part of the week, yet it was very pronounced during the latter part and at the close, inquiries being very brisk. Every tendency is toward a firmer price. One of the larger producing interests here reports the sale of about 4,000 tons during the week; another about 2,000 tons, together with scattering lots from 25 to 100-ton lots. Some gray forge was sold, but at $12.75, which is 25 cents per ton over No. 2 foundry base price. Low grade iron continues scarce, and any tonnage thrown on the market does not remain long unsold. There are at present four furnaces in the district out of commission, and no definite date has been set for their blowing in again. It is thought that they will be idle for several months yet to come. Stocks, on most of the yards, are moving at a rapid rate; and the warrant iron is going out in considerable quantities. The southern charcoal iron market is firm at $22.50 to $23 per ton at the furnace.

Cast Iron Pipe.—The movement of cast iron pipe is in small lots, this being about all that can be said of the situation. It is naturally a dull season of the year, but the manufacturers here report good prospective business in sight for the near future. The advance in price on heavy pipe will be governed largely by future status of the pig iron market, and the stability of one means stability of the other, to a great extent. Manufacturers are satisfied, apparently, with the business on their books and what can be reasonably counted on not far in the future. Following prices are quoted as firm, per net ton f. o. b. cars here: Four-inch, $25 per ton, average of $22 per ton for sizes to 12-inch, with $1 a ton extra for gas pipe.

Old Material.—There has been some better demand for old material than has prevailed for some time past. Dealers are stocking all that they can buy, and are shipping to customers right along on basis that has prevailed the past several weeks. No advance in price is looked for until there is a better buying movement in the pig iron market. Dealers are quoting following prices, per gross ton, f. o. b. cars here:

Old iron axles	$20.00 to 20.50
Old iron rails	15.75 to 16.25
Old steel axles	17.75 to 18.25
No. 1 R. R. wrought	14.00 to 14.50
No. 2 R. R. wrought	12.00 to 12.50
Old steel rails	12.50 to 13.00
Dealers' mixed wrought	11.00 to 11.50
No. 1 machinery	12.50 to 13.00
No. 1 steel	13.00 to 13.50
Old standard car wheels	13.75 to 14.25
Light castings, stove plate	9.75 to 10.25
Cast borings	6.00 to 6.25

SEATTLE

Improvement Noted in Pig Iron Market—Demand for Sheets and Bars.

Office of THE IRON TRADE REVIEW,
302 Pioneer Bldg., Jan. 14.

The iron trade of the north Pacific coast is quietly improving. One of the encouraging features is a better tone in the foundry trade, which has been quiet to a degree bordering on extreme dullness for the past two months. A number of large jobs for building castings are being figured on; prices for this class of work are practically unchanged. As the jobbing foundries fill up with work, higher prices are expected to prevail. Heavy specifying in bars, sheets and tin plate continues. The effects of the freight tie up resulting from the switchmen's strike are gradually wearing away. Optimism regarding business during the coming year is expressed on all sides.

Pig Iron.—A slight improvement is noted in the pig iron market and some contracting is being done for English iron to be delivered during the late summer. The undoubted strength now manifested in the British pig iron market is having a stiffening effect on local prices. Sales of American iron are very few and scattering. We quote gross tons as follows, foreign iron ex ship Puget Sound or Columbia river, domestic, f. o. b. Pacific coast terminals:

No. 1, English Jarrow, spot	$24.00 to 24.50
No. 1, Chinese, Han Yang, spot	23.00 to 23.50
Glengarnock, Scotch, to arrive June-July	24.50 to 25.00
No. 1 English, Jarrow, to arrive June-July	24.00
Southern No. 2, domestic	24.50 to 25.00

Merchant Iron.—Orders for iron and steel bars continue heavy. Prices have not changed, but are being better maintained than in the past. Local car manufacturers are busy and orders from the lumber interests are more frequent. Stocks are still low, but the condition in this respect has improved materially in the past ten days. All Pacific coast

rolling mills are operating. We quote base prices per 100 pounds, f. o. b. Seattle: Common iron bars, $2.30; soft steel bars, $2.50; machinery steel, $2.85; Norway iron, $3.75; angles, channels, zees and tees, under 3 inches, $2.80.

Sheets.—Heavy specifying in both black and galvanized sheets continues to characterize the market. Local stocks are low and railway shipments are being somewhat delayed by severe weather. We continue to quote, f. o. b. Seattle:

Blue annealed sheets, No. 12, 3.30c; No. 13, 3.35c; No. 16, 3.45c; Nos. 22 to 24, 3.70c; No. 28, 4.05c. Galvanized sheets, Nos. 12 to 14, 4c; No. 16, 4.10c; Nos. 18 to 20, 4.40c; Nos. 22 to 24, 4.55c; No. 26, 4.75c; No. 28, 5.25c; No. 30, 5.85c.

Old Material.—During the past six months there has been a continual increase in the amount of steel scrap used by the local foundries. It is estimated that the amount of steel scrap bought for foundry purposes in the North Pacific coast district has increased over 40 per cent in the period mentioned. The foundries, however, continue to obtain steel at satisfactory prices and there is no difficulty in obtaining the requisite tonnage. Scrap suitable for rerolling, however, is not available in large quantities. Rolling mills are paying higher prices for choice offerings. We quote in net tons, f. o. b. Seattle as follows:

Foundry scrap, No. 1 grade	$18.00 to 19.50
Foundry scrap, No. 2 grade	16.00 to 16.50
Old car wheels	16.50 to 17.00
Railroad wrought	10.00 to 11.00
Miscellaneous steel scrap	5.00 to 9.00

BRITISH IRON MARKETS.

Pig Iron Advances in Price—More Demand for Finished Material.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Jan. 8.

The first week of the new year has shown increasing strength in the pig iron market, the best evidence of which is an advance of 6d per ton in Cleveland warrants since Wednesday last. The present figure of 51s 5d, $12.58, for cash, is the best registered since the first week in November. For three months the selling figure is 52s 3½d, $12.79, which fairly reflects the strong confidence in the future. The railway traffic returns show a decided movement in the upper direction. In the Birmingham market Thursday, little pig iron business was done, mainly because several smelters decline to quote, having their books well filled for the next three months, while, on the other hand, such quotations as were made represented decided advances, which for the time being consumers decline to look at. The Cleveland stocks of pig iron are still increasing, though less rapidly. A serious wage dispute has already commenced in the Durham district, and if this continues, the pig iron stocks while they last will be extremely useful but they will suffer considerable depletion. The hematite market continues to show the greatest strength with mixed numbers for early delivery at 65s, $16.16. Materials have increased even more rapidly than the selling price, and a further increase is inevitable almost immediately. The Sheffield district has been buying extensively lately, and the tone in that district shows a marked improvement.

Finished Material.—In the Midland district while the finished iron trade shows some little improvement, it still fails to maintain any kind of parallel with raw material. Prices are slightly better, but still unremunerative. The bar department in particular is short of work, though in this department the competition of steel is being rather keenly felt. Apparently the galvanized sheet trade is on the eve of a boom with demand and prices steadily improving. The steel trade shows decided strength especially in the half-finished department. Bessemer sheet bars are now quoted at £5 and Siemens £5 2s 6d, but most consumers are covered for a considerable period, and there is not much new business passing. An early advance in the price of sectional steel is expected. Scottish makers have decided on an immediate advance of 5s, and English makers will probably take a similar step before the quarterly meeting next week.

METAL MARKETS.

NEW YORK.

Jan. 18.

Copper.—Dullness has prevailed in the market to a greater degree than any time this year. Prices have sagged and electrolytic can be had at 14c delivered 30 days, which is equivalent to 13⅞c net cash f. o. b. New York. Some sales are reported at a shade less. In the Lake market positive information is at hand that sales were made for March delivery at 14¼c and another sale is known to have been consummated at 14⅛c. This, of course, was for high grade Lake. In Europe prices seem to be slightly easier, but no metal is moving. It is difficult to sell copper on a declining market for securities. The fortnightly European statistics show that the stocks increased 640 tons and the afloats increased 120 tons. No effort is being made by the large producers to force sales, and at the same time there is no anxiety to buy. Exports are heavy, amounting to 13,500 tons so far this month.

Pig Tin.—The market continues to sag. Sales of tin for arrival this week were made at 32.30c. It is a peculiar fact that there is practically no spot tin in New York City. The Masaba is due today with 300 tons and that tin is selling at 32.30c. The Steel Corporation has plenty, but it is not released. This dearth of spot tin in New York is more the result of the storm than anything else, for there is plenty of it in Brooklyn store for sale at 32.30c, but it is impossible to truck it across the city. Four of the largest handlers of tin, however, report that they have nothing to offer at the moment. A great deal of the tin that arrived this month, amounting to about 2,500 tons, belongs to the United States Steel Corporation. The scarcity will be short-lived, for there are fully 4,000 tons of tin afloat for American ports, and plenty of it on direct London steamers.

Lead.—The market is very strong at the unchanged price of the American Smelting & Refining Co. of 4.70c. Outside interests are unable to close any business, as the St. Louis limits at 4.60c to 4.65c, make the New York price fully 4.75c.

Spelter.—The market continues very quiet. Plenty of spelter is available at 6.25c, New York. In St. Louis the market is unchanged at the wide range of 6.05c to 6.15c.

Antimony.—The market has quieted down slightly. Cookson's for spot delivery can be had at 8½c and can also be imported at the same figure. Hallett's for spot delivery is 8.37½c and likewise can be imported at the same figure.

Waterbury Average.—The Waterbury average is not used as much as formerly, but there are still many sliding scale contracts based on this average. The average for each month in 1909 is as follows:

January	14⅛c
February	13¼c
March	12⅞c
April	13c
May	13¼c
June	13½c
July	13½c
August	13½c
September	13¼c
October	13⅛c
November	13⅜c
December	13¾c

ST. LOUIS.

Jan. 17.

Lead and Zinc.—Choice zinc blende brought a top price of $52 a ton in the Missouri-Kansas-Oklahoma district last week, with 60 per cent grades ranging down to $49 and $47 a ton. Shipments were heavier than for the week before, with an average price

of $46.63 as compared with $47.50 the preceding week.

Choice calamine sold as high as $41 a ton, while the basis for 40 per cent grades was $25 to $27. The average price paid for calamine was $28.30, as against $28 for the previous week.

Lead brought a top price of $58 a ton for 80 per cent qualities, with an average price of $57.67 compared with $57.50 for the week before.

St. Louis spelter was weaker, being quoted at $6.05, as compared with $6.10 for the preceding week. Pig lead sold for $4.62½, a decline from $4.70 the previous week.

Shipments of ore were not as heavy as they would have been had not bad roads interfered with the hauling to the railroads.

CHICAGO.

Jan. 18.

New Metals.—The continued heavy weather has acted in a very unfavorable way upon the metal market, and there is a decided lack of activity in the inquiry reported this week. Prices on copper, spelter and tin have sagged a little.

We quote as follows: Lake copper, carload lots, 14¼c, casting, 13¾c, smaller lots, ¼c to ¾c higher. Spelter, 6.15c to 6.20c; lead, desilverized, 4.70c to 4.75c, in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $8 list f. o. b. La Salle in car lots of 600-pound casks; pig tin, 33½c to 33¾c; Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old Metals.—Difficulty in getting stock moved from the country and switched onto dealers' tracks, when it arrives within the switching zone, have been factors which have handicapped this market considerably, for some time. There is a very fair local demand, and the prospects for the future are good but the material is temporarily tied up by the congestion in railroad yards.

We quote dealers' selling prices, as follows: Copper wire, 13½c; heavy copper, 13½c; light copper, 11½c; heavy red brass, 13c; heavy yellow brass, 10¼c; light brass, 7½c; No. 1 red brass borings, 10½c; No. 1 yellow brass borings, 8c; brass clippings, 9½c; tea lead, 3.85c; lead scrap, 4½c; zinc, 4¼c; tin pipe, 31c; tin foil, 29c; pewter, 24c; electrotype plates, free from wood, 4½c; electrotype dross, 3¼c; stereotype plates, 5c; stereotype dross, 3½c; prime slab zinc dross, $78 per ton.

CORPORATION TAX LAW ATTACKED BY MANUFACTURERS.

In response to an invitation issued by the Illinois Manufacturers' Association, representatives of manufacturing and commercial bodies from nearly 150 cities, met in the Gold Room of the Congress Hotel, Chicago, on Jan. 14, to protest against the enforcement of the recent act of Congress, popularly known as the corporation tax law, which requires corporations to submit to a separate tax on their net incomes and to expose their accounts to public inspection.

About 250 delegates were present from Boston, New York, Philadelphia, Pittsburg, Cleveland, Indianapolis, Milwaukee, St. Louis, Des Moines, Minneapolis and St. Paul, and a hundred other cities. The sentiment of the members of the conference was unanimously in favor of suspending the publicity feature of the law, at once, and the repeal of the law in its entirety, as soon as possible. Very strong resolutions were adopted. The chairman was authorized to appoint a committee of eleven to devise ways and means with full power to carry out the spirit of the resolutions and test the constitutionality of the law if deemed advisable.

BILLET BUYING—SALES OF SOUTHERN PIG IRON.

Pittsburg, Jan. 19 (By wire.)

Further purchases of Bessemer billets by steel companies in the Pittsburg territory are noted, some of these contracts reaching round tonnages.

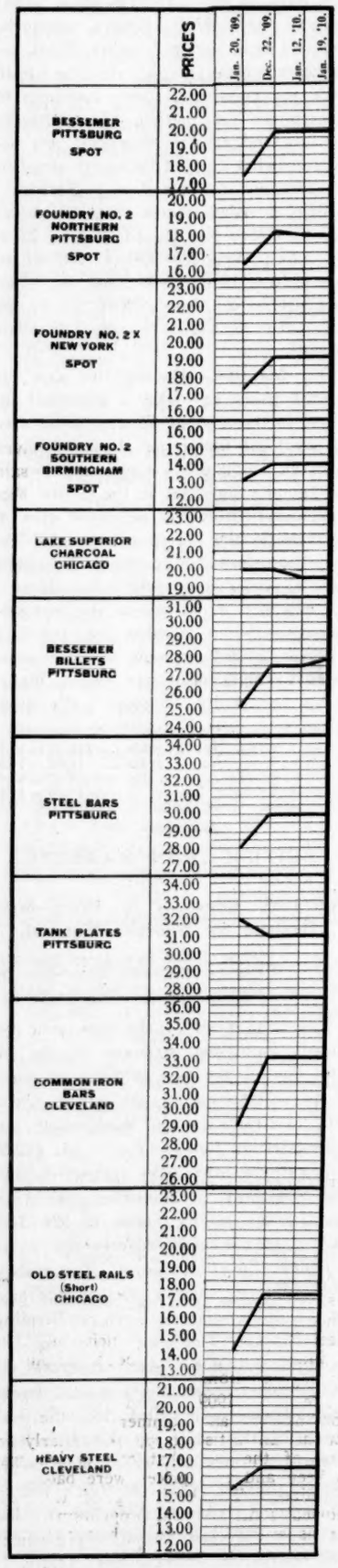
Selling of from 2,000 to 3,000 tons of southern iron in northern Ohio territory for second quarter on a basis of $14, Birmingham, is reported.

CHARLES KIRCHHOFF HONORED.

Charles Kirchhoff, who recently retired from the editorship of the Iron Age, after a connection of 30 years, was the guest of honor, Jan. 16, at a luncheon at the Engineers' Club, New York City, at which about 100 representative iron and steel men and members of the engineering profession were present. He was the recipient of a handsome bronze figure emblematic of the industry with which he was long affiliated, the presentation being made by George W. Cope, for a number of years his editorial associate.

Crane Co., Chicago, has purchased a parcel of land 25 x 100 feet at the northeast corner of Fourteenth street.

PRICE CHART.



IMPROVEMENT

SHOWN IN CALIFORNIA LABOR CONDITIONS.

Meeting of Metal Trades Association—President Robinson Discusses the Work — Election of Officers.

The California Metal Trades Association held its annual meeting Jan. 12 and elected the following officers: President, J. M. Robinson (re-elected); first vice president, S. J. Eva; second vice president, Constant Meese; executive committee: R. H. Postlethwaite, E. J. Fowler, George J. Henry Jr., William F. Murray, John T. Scott, George H. Randolph, John A. McGregor and Otto Schrader. Reports were submitted by President Robinson and Secretary Davis. President Robinson in his address said that the association had made no spectacular achievements and that it had purposely avoided active participation in public movements which would distract it from the main purpose of the association. Speaking of some of the things accomplished by the association, he said:

The Executive Committee has had fewer disputes to settle than heretofore, which is an indication of the better understanding existing between the parties to the agreement.

As a conspicuous example of the improved conditions brought about by our policy of conciliation, and as an incident to our agreement, we may cite the bonus hour compromise.

Our attitude toward the labor unions seems not to please some of our friends in the East (and nearer home), and our association has been the subject of unfavorable comment in some of the trade papers.

Recently, however, justice has been done us by THE IRON TRADE REVIEW, of Cleveland, who sent a special correspondent to San Francisco to study conditions here and prepare an article which should correctly define the situation, and state the circumstances under which the agreement of 1907 was made between the California Metal Trades Association and the Iron Trades Council.

The real constructive work of the Association has been in the hands of the various crafts, and the reports of their chairman should cover the work accomplished.

Work of the Founders.

At my request, ex-President Fowler has given me some items of interest concerning the work of the Iron and Steel Founders' branch, which will serve to illustrate what may be accomplished by co-operation.

The year 1909 started with a very slow market, and commercial conditions not at all satisfactory, particularly in view of the fact that competition was so keen and that prices were badly demoralized. The beginning of the year showed some general improvement, so far as mutual confidence between members is concerned, and later in the year this confidence increased so that now we can fairly say that we are beginning to discuss matters affecting our trade with greater freedom than ever before. The matters requiring discussion are not necessarily questions of price, as general shop and trade conditions are fully as important to the welfare of the members. After considerable discussion covering the needs of the trade in general the San Francisco Castings Co. was organized outside of the craft. This company was organized for the purpose of taking care of the expected municipal work, which is of such magnitude that it would be impossible for any one shop to take the entire contract. It was therefore thought wise to organize and incorporate a company, so that the work could be suitably divided among the various shops, to the benefit of both the shop and the city.

Shop Rules Changed.

Various questions in connection with this trade have been discussed. Previous to this work, many of the members were hampered by various shop rules, which seemed to be misunderstood by both sides, and in a good many cases worked to the detriment of the business. It seemed advisable that some regulation should be made by which shop rules should be standardized, and with this idea in view, a series of conferences were arranged with the members of the Molders unions, which resulted in establishing our present shop rules, by which the members enjoy a greater freedom than heretofore. One of the disagreeable union rules in force in all shops in this district for several years, has been the so-called blast time regulation, whereby a blast time was set for every shop, and men were expected to quit work at this time, whether they had finished their day's work or not. In a great many cases, this was a hardship to the employer, and as a result of the above-mentioned conferences this rule has been abolished, and the employer is at liberty to work his men for the full number of hours employed if he so desires.

The Wednesday Lunch.

One of the activities of the craft has taken place in an arrangement, by which the members of the craft take lunch together every Wednesday in an entirely informal manner. This naturally promotes a feeling of good fellowship between competitors, enabling them to discuss their troubles and indirectly helps to keep other members posted on the experiences and difficulties of those affected. It is believed that this method of meeting together will be productive of good results to the trade in general.

Covering subject of prices there has been no attempt whatever in any regulation of prices, the theory being that a better understanding among all members regarding other conditions will help to such an extent that members will naturally protect themselves by making prices suitable for the work done.

Our association cannot be expected to furnish a remedy for all the ills that flesh is heir to. If a man is slip shod in his methods of conducting business, if the way our grandfathers trod is good enough for him, he must not be surprised if some up-to-date competitor who is always on the lookout for improved methods, outstrips him in the race for business.

If times are hard, and there are more shops than jobs, he should not hold the association responsible, and if in the throat-cutting competition that has been prevalent among us for the past two years, his anxiety to fill his shop with work should get the better of his discretion, and in the end he should find that he would have made more money with less work, he should not blame the association.

The history of the past 20 years in the metal trades of San Francisco has demonstrated the foolishness of strikes and lockouts, and the tremendous loss which they entail both to the employer and employe, while their ultimate consequence, if often repeated, would mean the utter annihilation of our industry.

This being the case, it seems to me that with the feeling of mutual confidence now existing between the California Metal Trades Association and the Iron Trades Council, a continuance of the present peaceful relations should be assured; that with the improvement of business conditions, the people interested in the metal trades of San Francisco and vicinity, both employer and employe, should be enabled to share the benefits of returning prosperity.

Secretary's Report.

Secretary Davis, in his report, stated that the executive committee during the year had been called upon in only a few cases to deal with labor troubles, and that the understanding between labor and employers had been improved. Two new crafts, the master pattern makers and the electrical manufacturers had been added to the association during the year. The structural steel and ornamental iron branches of the metal trades had carried on a strenuous fight for a preference for home products and the structural steel interests of San Francisco had enlisted the same interests in Los Angeles, Portland and Seattle to join them in sending a delegation to the trans-continental freight bureau meeting in Chicago to work for a differential upon plain and fabricated material from points east of the Mississippi to the coast. It was the first instance, the secretary said, where the coast had ever united in a matter of that kind. As the result of the work of the association, the whole coast is now using imported structural material almost to the complete exclusion of the eastern product.

The Master Boiler Makers' branch had adjusted a labor difficulty during the year and the resulting peace had resulted in co-operation between the men and the employers in the home industry campaign.

The Fremont Foundry & Machine Co., Fremont, Neb., is completing the building of a brick foundry, 110 x 122 feet, one story. Two cupolas will be installed in the foundry, and the building formerly used as such will be employed as a stripping and cleaning room.

GREAT TONNAGE

OF IRON ORE WILL BE MOVED THIS YEAR.

Steel Corporation Will Take Twenty-Seven Million Tons—Troublesome Insurance Question.

Detroit, Jan. 18.

The Pittsburg Steamship Co. has chartered tonnage to move 15,000,000 tons of ore. As it has carrying capacity of 12,000,000 tons in its own ships, it will move approximately 27,000,000 tons during 1910. If the total ore movement reaches 50,000,000 tons, as is likely, independent interests will move about 23,000,000 tons, of which 12,000,000 tons will be in chartered ships. Therefore, but 27,000,000 tons of ore will be moved by contract tonnage during 1910 and about 23,000,000 tons by the fleets of the various steel-producing companies. The Pittsburg Steamship Co. allotted its proportion among the vessel owners on Monday afternoon on the basis of 70 cents from the head of the lakes, 65 cents from Marquette and 55 cents from Escanaba, being an advance of 5 cents over last year's rate.

Ore Unloading Charges.

Opposition has been manifested in certain quarters to the reduction of 5 cents in the ore unloading charge, particularly by those companies whose docks are not equipped with the most modern machinery. However, it is the big boat that fixes the freight rate, and it is the most efficient unloading equipment that will fix the unloading charge—therefore little can be expected to come of any opposition. The antiquated plant will have to be modernized. There is no doubt an excellent profit at 15 cents per ton for the big self-filling buckets, in fact, a close margin of operation may be expected as time goes on, as these machines are annually becoming more efficient. The new 15-ton buckets practically fill a 50-ton car in three loads, making a trip a minute. It was this efficiency that permitted the Corey to make six round trips running in seven days last season. Now the best that can be done from Conneaut to the head of the lakes, weather favorable, is 3½ days, and the best that can be done on the return trip is a trifle over three days. This, therefore, left the Corey, under the best conditions, but a part of one day to both receive her cargo of 10,000 tons and discharge it—and she did it six times running.

The Insurance Situation.

On 50,000,000 tons of ore the new conditions work out at $5,000,000 to the advantage of the vessel owners and men; if not for the insurance situation, they would certainly be feeling happy now. But the insurance feature is a dark blot. Hints have already been put forth in Detroit this week that two of the leading companies contemplate withdrawing from the field. Three companies withdrew definitely last year. The rate last year was 5 per cent, but the insurance companies lost heavily. This is in itself an excessive rate, being 10 per cent of the capital stock of a number of the companies operating such steamers. It is clear, therefore, to see why the insurance companies are discouraged. It is too hazardous. There is talk of increasing the rate to 7 per cent, which is absolutely prohibitive to the small type of carrier. There is no alternative, however. If the rate is not increased, the policy will have so many restrictions as to practically make an advanced premium.

S. P. Shane and Gen. George A. Garretson have been appointed receivers for the Gilchrist Transportation Co.

CHICAGO FOUNDRY COMPANIES CONSOLIDATE.

Chicago, Jan. 18.

The James A. Brady Foundry Co. has absorbed the E. J. Welch Foundry Co. Both plants will be operated as previously and E. J. Welch will be the general superintendent of both plants. This consolidation gives the James A. Brady Foundry Co. one of the largest melting capacities among the jobbing foundries in this section.

STEEL PIPE FOR GAS LINE.

Pittsburg, Jan. 19. (By wire.)

The Wichita Natural Gas Co. has placed an order for six miles of 18-inch and 13 miles of 12-inch steel pipe for a gas line in Kansas, and the material will be furnished by two makers. The Philadelphia Co. is in the market for its season's requirements of wrought iron well goods of various sizes, which aggregates about 5,500 tons.

J. D. Cornell Iron Works, New Orleans, La., was seriously damaged by fire Jan. 6, the loss being estimated at $40,000, covered by insurance.

NEW CEMENT PLANT

To be Built by the Universal Company at Buffington, Ind.

The United States Steel Corporation has authorized the expenditure of $2,450,000 by the Universal Portland Cement Co. in the construction of cement plant No. 6 at Buffington, Ind., to have a capacity of 2,000,000 barrels of Universal Portland cement per annum.

This plant will be located alongside of plants Nos. 3 and 4 of the Universal company, which have been in operation for some years. It will be so designed as to be easily extended to its ultimate capacity of 4,000,000 barrels per annum without interference with operations.

The plant will be operated entirely by electric motors, the power being transmitted from a power station located at Gary, Ind., containing gas engines utilizing waste gases from the blast furnaces. The product will be made from blast furnace slag from the Gary plant.

With the extension of cement plant No. 5 at Universal, Pa. (near Pittsburg), just completed, to a capacity of 3,500,000 barrels a year, this new plant No. 6, when completed at the beginning of 1911, will give the Universal Portland Cement Co. a total output of 10,000,000 barrels per annum of Universal Portland cement, all manufactured from blast furnace slag and limestone.

The output of Universal Portland cement each year since it was first manufactured in 1900, is as follows:

	Barrels.
1900	32,443
1901	164,316
1902	318,710
1903	462,930
1904	473,294
1905	1,735,343
1906	2,076,000
1907	2,129,000
1908	4,535,000
1909	5,786,000
1910 (estimated)	8,000,000
1911 (estimated)	10,000,000

PASSAIC STEEL CO. AFFAIRS.

The Passaic Structural Steel Co., Paterson, N. J., has been organized among the members of the bondholders' committee to take over the plant of the Passaic Steel Co., recently bought in at chancery sale by this committee for about $400,000. This new corporation will operate only the bridge shop and will also serve as a holding agency as it is likely that some other disposition of the plant will be made shortly. F. C. Reinhart is president and J. Barclay Cook secretary and treasurer.

NEW VICE PRESIDENT

And General Manager for Dominion Coal and Steel Companies.

Toronto, Jan. 15.

Meetings of the directors of the Dominion Iron & Steel Co. and Dominion Coal Co. were held at Montreal a few days ago at which M. J. Butler, deputy minister of railways, and chairman of the Intercolonial Railway Commission, was appointed second vice president and general manager of Coke companies with headquarters at Sydney. Mr. Butler is considered one of the ablest executive business men in Canada, and has been identified with several railway and industrial enterprises including the Rathbun Co., of Deseronto, and the Montreal Locomotive Works. He has been connected with the government railway department since 1902.

The operations of the Dominion Iron & Steel Co. were affected adversely by the shortage of the supply of coal owing to the Dominion Coal Co. strike, nevertheless the production of steel during 1909 shows a satisfactory increase. The figures of the output in tons as compared with that of 1908 are as follows:

	1909.	1908.
Coke	401,182	411,086
Pig iron	256,496	262,839
Steel ingots	296,950	279,513
Blooms	262,052	248,621
Rails	140,738	152,440
Wire rods	73,004	40,420

Iron ore was received from Wabana to the amount of 530,682 tons and from other sources, 14,765 tons, compared with 556,255 tons from Wabana and 44,212 from elsewhere in 1908. The new coke ovens are well under way and contracts have been let for the new blast furnace, the additions to the open-hearth and some other additions to the plant.

The International Tool Steel Co., Ltd., recently incorporated with a capital of $750,000 has secured a valuable deposit of magnetite ore on the St. Lawrence river, east of Montreal as a source of raw material and is now seeking a location for its plant. A number of sites are under consideration and the preference is likely to be given to Welland.

Two extensive German bridge-building firms have representatives examining the plans for the Quebec bridge with a view to putting in tenders.

VENEZUELAN ORE TITLE.

The Venezuelan government, according to cable advices from Caracas, has refused to recognize the transfer of the Imataca ore bodies to the Pan-American Ore Co., in which a large eastern steel manufacturer is reported to be interested, on the ground that the title to the property is not clear. A protocol, to which the commissioner of the United States was a party, expressly prohibited the acquisition of this deposit by any person or persons until a clear title could be shown, and it is in accordance with this that the government's stand is taken. The ore company had expected to begin operations at an early date.

MILLION DOLLAR CONCERN

Organized at Birmingham With Two Ohio Men as Officers.

The Birmingham Horseshoe & Rolling Mill Co. has been organized with a capital stock of $1,000,000. The president is N. K. Reed, and vice president, W. T. Shipe, both of Middletown, O.

The plant is to be electrically driven. The capacity will be 400 kegs per day with 100 tons of bar iron for the market. E. I. Penruddocke is consulting engineer, Brown Marx building, Birmingham, Ala.

WILL TAKE OVER DENVER ROLLING MILLS.

The American Iron Mills Co. has been organized by John and Robert Carey, of Denver, Colo., to take over the rolling mill plant of the Western Rolling Mills Co., of that city. The plant which has four heating furnaces and two trains of rolls, one 10-inch and the other 18-inch mills, was owned and operated originally by the Union Iron & Steel Co., later being acquired by the Western Iron Mills Co. and leased to the Western Rolling Mills Co. in 1907. Ie is proposed by the new owners to call in the original bond issue of $150,000 and issue new bonds running 20 years at 6 per cent, to the amount of $210,000. From the proceeds of the proposed issue it is planned to retire the old bonds as well as make needed improvements to the mill plant. The plant has an annual capacity of 15,000 tons of merchant bar iron, bolts and light rails.

The Birmingham Mfg. Co., Birmingham., Ala., which was recently incorporated with $35,000 capital stock, has let the contract for the erection of a building 60 x 100 feet, of mill construction, in which it will manufacture pumps and plumbers' supples. It advises that its machinery equipment has been purchased.

BIRD FURNACE

Purchased by D. C. Davies, One of the Stockholders of the Company.

D. C. Davies, one of the stockholders and directors, was the successful bidder for the plant of the Bird Iron Co., which was offered at public sale by Capt. H. R. Brown, receiver. The bidding was begun at $65,000 and was participated in by Mr. Pollock, of Rogers, Brown & Co., William Hoover, of Wellston, O., representing Philadelphia interests, and Mr. Davies, who acted for himself and local associates. The bidding was lively and the property went for $99,000, which was about $4,000 in excess of the appraised value.

After the sale Mr. Davies stated that the plant would at once be overhauled and put in shape for operation. A number of well-known iron men of this section will be associated with him in the plant, among them, it is understood, being Oscar Richey, of the Kelly Nail & Iron Co., and the Sarah Furnace Co.

Among those who attended the sale were: J. H. Browne, of Wellston, Mr. Bentley, of Columbus, Messrs. Eaton and Rhoades, of Cincinnati, A. D. Cole, of Maysville, Ky., and Mr. Pollock, of Cincinnati.

NEW ITALIAN BLAST FURNACE PLANT.

The first furnace of the new smelting works in course of erection at Bagnoli, near Naples, was lighted and brought into working condition on Dec. 9. The second furnare is expected to begin working early this year. The new works, which will use Elba ore, are to have three furnaces, with a total daily output of 600 metric tons of pig iron, while there are at present in Elba three furnaces with the same aggregate output. —*Iron and Coal Trades Review*, of London.

EUROPE'S COPPER SUPPLY.

The European supply of copper metal on Jan. 15 was recorded at 109,540 tons, compared with 109,020 tons on Jan. 1, and 55,000 tons on Jan. 15, last year.

The Cleveland Speed Indicator Co., Cleveland, has certified to an increase of capital from $50,000 to $200,00.

The Lewis Corrugated Culvert Co., Elyria, O., has increased its capital from $10,000 to $100,000.

PERSONALS.

Frank Eaton, of Hickman, Williams & Co., Cincinnati, left Tuesday for an extended trip through Mexico.

E. S. Cook, president of the Warwick Iron & Steel Co., will sail for Japan in February.

W. S. Pilling, of Pilling & Crane, Philadelphia, leaves about Feb. 1 for an extensive tour of Egypt.

Alexander B. Scully, president of the Scully Steel & Iron Co., Chicago, was painfully injured some days ago by a fall on the icy sidewalk.

Frederick L. Pierce, treasurer of the Cutler-Hammer Mfg. Co., Milwaukee, has been elected a director of the National Exchange bank of that city.

At the annual meeting of the Standard Coupler Co., George A. Post Jr. was elected a director to succeed J. E. French, the other directors being re-elected.

W. J. Greer has been appointed Pitsburg representative of the Van Dorn Electric & Mfg. Co., Cleveland, maker of the "Hard Service" electric drills and reamers.

W. H. Cox has been elected a director and manager of the Sure-Hold Calk Mfg. Co., Mansfield, O. The company is now installing machinery in the new factory.

Otto A. Ruemelin has been appointed superintendent of the shops of the Pawling & Harnischfeger Co., Milwaukee, to succeed H. C. Frentzel, who retired after a service of 22 years.

Clair Foster, who has been first vice president of the Thompson-Starrett Co. and secretary of the Standard Plunger Elevator Co., has been appointed water register of New York City.

E. K. Morse, consulting engineer. Pittsburg, has been elected as president of the Engineers' Society of Western Pennsylvania, to fill the vacancy caused by the death of George Barnsley.

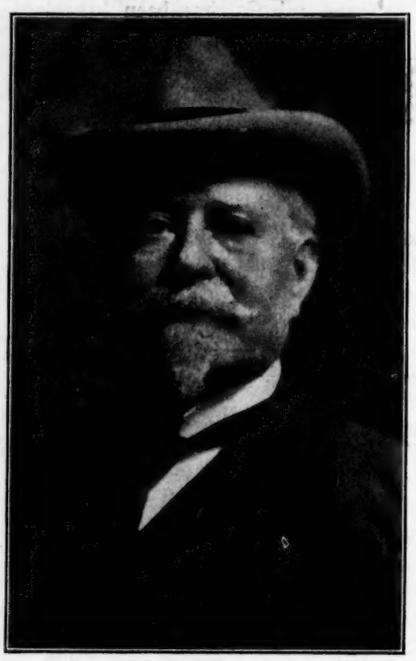
O. C. Gayley has been chosen vice president and director of the Western Steel Car & Foundry Co. to succeed J. W. Friend, deceased. J. H. Regan and James A. Blair have been elected directors to succeed A. C. and D. W. McCord, retired.

J. G. Phillips, for several years connected with the electric light department of the General Electric Co.'s Pittsburg office, has resigned to become associated with the Rutherford Rubber Co. of New Jersey, and will make a specialty of selling Sterling automobile tires.

THE SUCCESSFUL CAREER OF S. A. RICHARDS.

The retirement, the first of the year, of S. A. Richards from the management of the Struthers, O., stack, of the Struthers Furnace Co., closed the very interesting career of Mr. Richards as an iron maker extending over a period of 50 years. Some months ago, Mr. Richards expressed his intention of retiring from active business the first of the year and of spending his well earned leisure on a fine country property located near Warren, O. He will remove from Struthers about March 1.

Mr. Richards has seen the rise of the blast furnace industry in the Mahoning valley from the days of the stone stack with charcoal fuel to these days of the 600-ton coke furnaces. His



SAMUEL ALLEN RICHARDS.

father, William Richards, went to the Mahoning valley in 1848 and became closely identified with the growth of the iron business, making the first water jacket tuyeres used in the valley blast furnaces. William Richards went to Youngstown originally to operate the Brier Hill stack, owned by Jonathan Warner and William Philpot, long since torn down. With his father, S. A. Richards, then a lad of 16, ran the Eagle furnace, also now but a memory. Later, they built a furnace at Warren, as well as a rolling mill. But a disastrous fire and the panic of 1873 destroyed the industry. S. A. Richards then went west, for some years operating a blast furnace at Joliet, Ill., and later returning to Sharon, Pa., when he began his long career with the firm of Runyon, Stubbs & Co., later the Struthers Furnace Co. During the progress of rebuilding the Struthers stack last fall into a fine modern furnace, Mr. Richards expressed his desire to retire after the new furnace had been placed in operation. His son, Joseph Richards, who had been blower of the stack for several years, has retired with his father. The new manager is R. H. Wilkinson, formerly superintendent of the Niles, O., stack, of the Carnegie Steel Co.

Several days ago, Mr. Richards was summoned from a meeting of directors of the Struthers Banking Co. to the furnace office, where he was given a delightful surprise by the officers and directors of the company as well as by his former employes. He was presented a handsome rolltop desk, typewriter and complete set of office furniture. Beside, he was handed a set of complimentary resolutions adopted by the officers and directors of the company, expressive of their high personal regard for Mr. Richards as well as of his highly successful career, hoping for his retention as a member of the board and extending best wishes for continued health and prosperity.

OBITUARY.

William W. Allen, general manager of the Weir Frog Co., Cincinnati, died Jan. 10, at Sloatsburg, N. Y., aged 39. He had been general manager of the company for a little over three years, conducting its affairs from his office at Sloatsburg, dividing his time between the management of the Cincinnati concern and the superintendency of an iron works located at his home.

J. W. Fuller, a director of the Empire Steel & Iron Co., owner of the Lehigh Carwheel & Axle Co., and one of the best known iron and steel men in the eastern Pennsylvania district, died unexpectedly of apoplexy, Jan. 14. His home was at Catasauqua, Pa. He was well advanced in years, being a veteran of the civil war. Only three days before his death he was in New York to attend a directors' meeting of the Empire company.

John Pedder, who had been identified with the steel industry of the Pittsburg district, died at Pittsburg, Jan. 15, aged 68. Mr. Pedder was at one time interested with others in the steel works at Beaver Falls, which was later absorbed by the Crucible Steel Co. of America. At one time he was manager of the Wayne Iron & Steel Works, Pittsburg. Mr. Pedder was a man of great ability in mechanical lines and was inventor of numerous devices of importance to the steel industry, including a crucible for melting tool steel.

Liquidation Causes Heavy Decline

The week in the stock market witnessed a collapse in prices throughout nearly the whole list. Liquidation carried some stocks down as much as 10 points, and brief intervals of firmness were followed by new declines. The Rock Island incident culminated in the temporary suspension of S. B. Chapin & Co. from the stock exchange. Money was easier, owing to the heavy inflow of cash.

Monday the market was dull and weak. Call money ran about 5½. Cotton broke violently. Tuesday, money was steady at 5½ per cent; the market was weak and closed lower, and Steel Common was heavily sold. On the Pittsburg market, La Belle Iron made a new high record. Wednesday, stocks declined to the lowest average prices in two months. Call money fell 3 per cent. Thursday, stocks opened weak, but recovered in the afternoon. Money was easy and cotton continued weak. Friday was a day of liquidation in nearly all speculative markets and prices declined; call loans continued easy. Saturday, stocks were weak at the opening, but closed somewhat higher for the day. Cotton rallied.

Money on call throughout the week ranged from 6 to 3 per cent, and closed Saturday at 4 per cent. Clearings throughout the United States dropped to $3,883,909,097, which was nearly a billion dollars less than the clearings for the preceding week. The actual report of clearing house banks shows loans increased $12,239,500; deposits increased $36,393,500; surplus increased $13,232,425, and the ratio of reserve 27.3, against 26.3 the week before. Trust companies and non-member banks showed loans decreased $21,253,000; deposits decreased $19,685,600, and the percentage of reserve, 16.9, unchanged. Exports of gold from New York were $806,500, nearly all to Argentina. Imports at New York were $100,441.

Failures during the week were 312 against 310 last week, and 301 the corresponding week last year. Liabilities in commercial failures for the month up to Jan. 15 were $8,882,620, against $5,231,336 for the corresponding period last year. Arrvals of immigrants at New York were 7,217, which was somewhat above the previous week's record, but below that of the corresponding week the year before. Surplus cars at the end of the week numbered 38,416, that being an increase of 4,116 for the fortnight.

The number of shares sold on the New York exchange was 5,367,714, against 5,495,600 the week before, and 3,973,640 the corresponding week of 1909. Bonds, other than government bonds, were sold to the value of $20,301,000, against $21,069,000 the week before, and $27,355,000 the corresponding week last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Jan. 15	Changes in week	Date 1910 Ann.M't'g.	Stock Outstanding	Basis	Dividend Last Dividend	Dividend Date Last Div. Pay.
Allis-Chalmers	14	—1		$19,820,000			
Allis-Chalmers, pr	50	—3⅝		16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	12⅜	—1	Feb. 2	41,233,300			
American Can, pr	79½	—1½		41,233,300	7 cum.	1¼ Q.	Jan., 1910
Am. Car & Fdy	67½	—4	June 24	30,000,000		½ Q.	Jan., 1910
Am. Car & Fdy., pr	117½	—2⅜		30,000,000	7 n. c.	1¾ Q.	Jan., 1910
American Loc	57⅜	—2¾	Oct. 18	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	114½	.....		25,000,000	7 cum.	1¾ Q.	Jan., 1910
Am. Ship	77	.....	Oct. 12	7,600,000	4	1 Q.	Dec., 1909
American Ship, pr	111½	.....		7,900,000	7 cum.	1¾ Q.	Sept., 1909
Am. Steel Foundries(new)	64	— ¼	Dec. 1	17,184,000		1¾ Q.	
Barney & Smith	40	.....	June 7	2,000,000	4	.....	Sept., 1907
Barney & Smith, pr	115	.....		2,500,000	8 cum.	1 Q.	June, 1908
Bethlehem Steel	32½	— ½	April 5	14,862,000		.....	
Bethlehem Steel, pr	66	.....		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	50⅜	—1⅞	Mar. 15	45,000,000*	3	¾ Q.	Aug., 1909
Cambria Iron	46¼	.....		8,468,000*	4	2 S. A.	Sept., 1909
Chicago Pneumatic Tool	40	— ½	Feb. 21	6,145,000	4	2 S. A.	Oct., 1907
Colorado Fuel	44½	—4½	Oct. 17	34,235,500		1¾ Q.	April, 1902
Crucible Steel	16⅛	—1⅜	Oct. 19	24,578,400		3½	
Crucible Steel, pr	88¾	—4¼		24,436,000	7 cum.	1¾ Q.	Dec., 1909
Empire Steel	15	.....	Feb. 23	1 254,770		.....	
Empire Steel, pr	80	.....		2,500,000	6 cum.	3 S. A.	July, 1909
Fay & Egan	95	.....	Feb. 15	1,000,000	7	3 S. A.	Nov., 1908
Fay & Egan, pr	120	.....		1,000,000	7 cum.	1¾ Q.	Nov., 1909
General Electric	154⅝	—4⅞	May 10	65,179,600	8	2 Q.	Jan., 1910
Harbison-Walker	34	—1½	Jan. 17	18,000,000		2 Q.	Oct., 1907
Harbison-Walker, pr	94½	.....		9,600,000	6 cum.	1½	Oct., 1909
International Pump	50¾	—3¾	May 10	17,762,500		1 Q.	April, 1905
International Pump, pr	90	.....		11,350,000	6 cum.	1½ Q.	Nov., 1909
Lackawanna Steel	64	.....	Mar. 9	34,978,000		.....	.....
Lake Sup. Corp.	26½	—1¾	Oct. 5	40,000,000		.....	.....
New York Air Brake	88	—4¾	June 16	10,000,000	8	2 Q.	Oct., 1907
Niles-Bement-Pond	104	.....	Feb. 2	8,500,000	6	1½ Q.	Dec., 1909
Niles-Bement-Pond, pr	104	.....		2,000,000	6 cum.	1½ Q.	Nov., 1909
Otis Elevator Co	56	+1	Mar. 21	6,375,300	3	1½ S. A.	Oct., 1909
Otis Elevator Co., pr	97	.....		6,295,000	6 n. c.	1½ Q.	Oct., 1909
Pa. Steel	65	.....	May 9	10,750,000		.....	.....
Pa. Steel, pr	115	.....		16,500,000	7 n. c.	3½ S. A.	Nov., 1909
Pittsburg Coal Co	23	—4¼	Mar. 8	28.104,600		.....	.....
Pittsburg Coal Co., pr	76½	.....		27,071,800	7 cum.	1¼ Q.	Jan., 1910
Pressel Steel Car	46	—5	Feb. 16	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	104½	—3		12,500,000	7 n. c.	1¾ Q.	Nov., 1909
Pullman	189½	—1¾	Nov. 9	100,000,000	8	2 Q.	Nov., 1909
Railway Stl. Spring	47	—2¼	Mar. 3	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	106½	.....		13,500,000	7 cum.	1¾ Q.	Dec., 1909
Rep. Iron & Steel	41¼	—3½	Oct. 19	27,191,000		.....	.....
Rep. Iron & Steel, pr	102	—1¾		20,416,900	7 cum.	1¾ Q.	Jan., 1910
Sloss Sheffield	83¼	—2¾	Mar. 9	10 000,000	5	2 Q. †	Nov., 1909
Sloss-Sheffield. pr	118	+1		6,700,000	7 n. c.	1¾ Q.	Jan., 1910
U. S. Pipe & Fdy. Co	28⅞	—2⅜	June 22	12,106,300	2	1 Q.	Dec., 1907
U. S. Pipe & Fdy. Co., pr	83	— ⅜		12,106,300	7 n. c.	1¾ Q.	Dec., 1909
U. S. Steel	85½	—3¼	April 18	508,302,500	3 n. c.	1 Q.	Sept., 1909
U. S. Steel, pr	123¼	—1⅜		360,281,100	7 cum.	1¾ Q.	Aug., 1909
U. S. Steel, 5s	104⅜	— ⅜		463,798,000	5	.....	.....
Va. Iron, Coal & Coke	69	—4	Sept. 20	9,073,680		.....	.....
Westinghouse Elec	73½	—8	July 27	27,173,200*		1¾ Q.	Oct., 1909
Westinghouse Air Brake	144¾	— ½	Oct. 4	14 000,000*		4 Q.	Oct., 1909

†Includes deferred dividend of ¾ of 1 per cent.
Par value of shares $100, except those starred (*), $50.

Copper Stocks.

New York.—Amalgamated Copper closed 85⅛, a net loss of 2¼.

Boston.—Butte Coalition closed 25⅞, a net loss of 1⅜; Calumet & Arizona closed 95, a net loss of 5½; Calumet & Hecla closed 665, a loss of 5; North Butte closed 42¼, a loss of ½; Quincy Mining closed 88, unchanged.

Financial Notes.

George W. Jackson, Inc., Chicago, has declared an initial dividend of 4 per cent on common stock, payable 1 per cent quarterly, beginning March 1.

The International Harvester Co. has decided to distribute $20,000,000 in stock to the present holders of stock in proportion to the amount of their holdings. There will also be a cash dividend of 4 per cent.

The earnings of subsidiary companies of the Lake Superior Corporation for the five months ending Nov. 30, were: Gross, $3,938,200, an increase of $1,064,000; net earnings, $729,400, an increase of $316,000, available for interest on 5 per cent first mortgage bonds to the amount of $10,000,000, as well as providing for depreciation and renewals.

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January	5,506
February	5,346
March	5,396
April	5,508
May	5,533
June	5,551
July	5,572
August	5,597
September	5,609
October	5,628
November	5,634
December	5,662

January 20, 1910

THE STRENGTH OF LAKE SUPERIOR ORES.

Comparisons are naturally made between the selling prices of pig iron and steel commodities at present and at the time Lake Superior ores were last on the present season's basis. The new prices constitute a restoration of the 1907 level, which was higher than that of 1906 or 1908. Our table published a fortnight ago, giving Lake Superior ore prices for a period of 21 years, with the dates of the buying movement and the concurrent prices of foundry and Bessemer pig iron in the valleys, indicates that when the 1907 prices were established both Bessemer and foundry iron were $21.50, valley furnace, present prices being several dollars a ton lower. Nevertheless ore has sold freely, substantially all the Bessemer ores for the coming season being taken up, with a large proportion of the non-Bessemers. The ore has moved with almost as much freedom as when similar prices were established three years ago, and when pig iron was at a higher level.

The comparison indicates the change which has occurred merely in three years, in the growing hold Lake Superior ores have on the trade. The matter cannot be dismissed as merely one of supply and demand, for supply and demand have both increased, in substantially the same ratio. There has been a rapid growth in demand for pig iron, and that demand has been met chiefly by the erection of blast furnaces in the central west. Of the 56 new furnaces blown in during the past five years, and the 20 now being built, a total of 76 furnaces, only 13 are not directly tributary to the Lake Superior ore region. The supply has kept pace with the demand, for while the 27,585,904 tons moved out of the region, in 1902 remained the record for three years, the estimate for 1910 is roundly 50,000,000 tons, and in no year has the physical capacity of mines and transportation facilities been more than comfortably strained.

High prices, relative to the "cheap as dirt" prices of most of the years in the nineties, have not served to cause supply to outrun demand. The establishment of a fair valuation upon Lake Superior ore in the ground has encouraged development, which year by year has required greatly increased capital. It would have been considered out of the question 10 or 15 years ago to spend anything like the amount of money in developing properties which is now appropriated willingly. Without the encouragement of fair prices for Lake Superior ore, the development of the region would have been held back and the whole progress of the American iron and steel industry retarded.

The strenuous change in the amount of capital involved in Lake Superior iron ore mining has made old cost comparisons entirely out of date. The capital tied up in plant and in deferred charges to operation involves a cost per ton of ore which is of much more importance than the mere cost of mining which in the early days represented the chief item in the cost sheet. The Lake Superior ore trade has been put upon an entirely new basis. It is in recognition of this change in conditions, indicating the permanence of the trade, that the railroads have found it desirable to make their heavy expenditures in dock improvements along Lake Erie. In countenancing the appropriations for such works, the railroad officials were probably influenced more by the object lesson of the money the ore interests have had to spend so freely in developing their mines than by any other consideration.

THE LABOR OUTLOOK IN THE METAL TRADES INDUSTRY OF THE PACIFIC COAST.

Editor THE IRON TRADE REVIEW:

The long-looked-for resumption of normal business conditions, which now seems definitely on the horizon for 1910, will bring with it many serious problems for the Pacific coast iron trade industries, and the broadest co-operative spirit must prevail in order that a period of industrial peace and stability may permit this great territory to assume its justified position as a manufacturing district.

Its separation from the great manufacturing centers of the east by thousands of miles of mountains and plains no longer offers the same difficulties of transportation, now that the eager railroads have tested the richness of its commercial relations, and concentrated their great wealth and engineering skill in penetrating its vastness. This vastness not only offers a field of new hope for millions of skilled and unskilled workmen, but also a tremendous area of absorption for the varied manufactures of the east and the next few years will undoubtedly usher in a period of equalization between the two sides of the American continent which will ultimately leave them on a broadly competitive basis.

In the light of these facts it is an interesting study to note the relative position that different communities have taken in their treatment of the labor problem. San Francisco, by early settlement and subsequent development, retains its place as the metropolis of the Pacific coast, and the influence of its business methods has for years been a dominant factor which has only lately become of less

controlling force through the rapid growth of other cities. Starting as a mining town, and by virtue of its wonderful climate, location and resources, its people have enjoyed the opportunity for a greater automatic acquisition of success than in the cities in the east, and as a result have been more careless in the preservation of the elements of this success than would have resulted from more active local competition. It produced bounteously and gave out with equal bounty in response to the demand made upon it, and thus became somewhat prodigal along all lines, which naturally endowed its industrial policy with unusual generosity. This offered an exceptional chance for the unlimited growth of unionism, which under certain kinds of leadership merely stands for increased demands, and thus the city of San Francisco became the bottle-tight union city of the United States.

Now, if modern unionism merely meant the successful carrying out of its announced principles, no harm could come from such a condition, but unfortunately the principles of unionism do not harmonize with the practices inspired and insisted upon by the average union leader, and these practices do not harmonize with American spirit and freedom, so the bottle-tight Union City of San Francisco found itself facing problems of great seriousness, which affected its business relations with other cities of the United States. But the people of the Golden Gate under ordinary conditions are well able to manage their own affairs and might have successfully solved these problems had they not suddenly been overwhelmed by the most tremendous catastrophe which has ever devastated any city of the United States.

The circumstances and results of this calamity are too well known to make further detail opportune, and in contemplation of the wonderful recovery which the city has made, it ill befits any outsider to criticize the various means which became necessary to sustain such a magnificent effort. Now, that the effort has resulted in what seems like a superhuman accomplishment, a sober study of some of the sacrifices shows that the granting of the eight-hour day in the iron trade industries is not the least portentious in its effect upon the future manufacturing importance of San Francisco.

No one city of the United States is of sufficient importance in any one industry to dictate its policy to all other cities, and the apparent conception of the mechanics of San Francisco that they can equalize the handicap which they have forced on their employers by bringing the rest of the United States to the eight-hour day is founded on a spirit of intolerant bigotry and domination which is the rock on which modern labor unionism will wreck itself.

The cities of Los Angeles, Portland, Tacoma and Seattle glory in the restoration of San Francisco to her former proud position, but their own problems of destiny are too serious to be thrust aside by accepting any such false theory of industrial success, as that promised by the eight-hour work day in the closed shop. The United Metal Trades Association of the North Pacific Coast, The Founders' and Employers' Association of Los Angeles and The Employers' Association of Oregon are firmly intrenched behind the broad American principles of the open shop movement. It is a movement which has no apologies to offer and no secrets to conceal, and is doing more for the uplift and development of the competent mechanics of the United States than any other industrial crusade ever waged.

W. H. CORBETT.
President Willamette Iron & Steel Works.
Portland, Ore., Jan. 8, 1910.

GAS ENGINE SALES.

The Bruce-Macbeth Engine Co., of Cleveland, is about to install for the municipal lighting plant of Canal Dover, O., one of its 250-horsepower, vertical, four-cylinder gas engines, direct connected to 175-kilowatt alternating current generator. The company has also sold a duplicate of this engine to The Willard Storage Battery Co., Cleveland, which will make the fourth engine installed at that plant. Through Buffalo representatives, the Sterns Electric Equipment Co., the Bruce-Macbeth Co. has also sold one of these 250-horsepower, four-cylinder engines to The E. R. Thomas Motor Co., Buffalo. This will also be the fourth engine installed at this plant. It also reports a fourth sale of an 135-horsepower, four-cylinder engine to The Monongahela Glass Co., Fairmount, W. Va.

BRILL THESIS CONTEST.

A thesis contest inaugurated by J. G. Brill & Co., in 1908, for theses on timely topics announced by the company, has been continued for 1910. The subject selected for this year is "Design of an Electric Railway Car for Street Service." Three prizes, $250, $150 and $100 are offered to senior students of colleges, universities and technical schools who will be graduated in 1910. A jury of three judge the theses. The prizes for 1909 were awarded to Charles T. Ripley, University of Illinois; Victor D. Dressner, Brooklyn Technical Institute, and Robert T. Pollock, Worcester Polytechnic Institute, respectively.

SUCCEEDS DR. DUDLEY.

The Pennsylvania railroad announces the appointment of Frederick N. Pease, assistant chemist of the Pennsylvania railroad, to the position of chemist which was recently made vacant by the death of Dr. Charles B. Dudley.

MANY IMPROVEMENTS

Being Made to Plants of Crucible Steel Co. of America.

Some time ago, the board of directors of the Crucible Steel Co. of America, because the company was in a strong position, decided to improve its plants up to the latest standard for economical working. At the Atha works, Harrison, N. J., where a large amount of government work is done, the company is erecting a modern power plant to be newly equipped with mechanical stokers, steam economizers, and such mechanical devices as will automatically handle coal and ashes, thus cutting down the labor costs to a minimum. It also proposes to install a number of large gun lathes to take care of the larger calibre of guns required by the government. Additional hammers and presses are to be supplied for handling more rapidly an increased output of projectiles for naval use.

At the Park works, Pittsburg, a system of crane runways has been contracted for, with electric cranes on the lot running between Thirty-first and Thirty-second streets on the Allegheny Valley railroad for the economical handling and storage of billets and raw material. At the LaBelle works, Allegheny, Pa., the company is just completing a large addition, which is expected to be in operation during the present month, the improvement covering a new 20-inch mill with engine, furnaces and all economical handling mechanisms complete, in addition to a new steam plant to control it. Through this means the company will considerably increase its production of implement steel at this works and at the same time reduce its cost of manufacture.

At the spring plant, McKees Rocks, Pa., which are already turning out over 1,500 tons of railroad springs per month, there is being completed a modern steam plant, equipped with mechanical stokers, which, through this additional power, will enable the company to largely increase its output of springs and at reduced cost.

The Chamber of Commerce, of Birmingham, Ala., has offered a prize of $200 for the best design for an emblem typifying a united people co-operating and building a great city, expressing this spirit of co-operation and forecasting the future of Birmingham as one of the country's manufacturing centers.

The Pittsburg Malleable Iron Co. has declared a quarterly dividend of 2½ per cent, payable Jan. 20.

AMONG MACHINERY MAKERS.

PITTSBURG.

Important Mill Contracts Placed—Large Construction Under Advisement.

Office of THE IRON TRADE REVIEW,
510 Park Building, Jan. 18.

Important improvements to iron and steel plants, which will involve an enormous amount of equipment, are still before the machinery market. A large amount of this work is before equipment builders awaiting awards, while there are other extensive plans of enlargement in Pittsburg and other territories which have not yet developed to the point to warrant public announcement. Some of the larger pending projects are moving a little better and mill and other equipment awards are being made. With the principal makers of heavy machinery in this territory operating at capacity and assured of such activity for a number of months by the crowded condition of shops, the outlook before the market is very promising.

Along with the demand for rolling mills, transfers, roll tables, etc., there is an active market for the auxiliary lines of equipment, including cranes and for power machinery embracing gas and steam engines, electrical apparatus, etc. The machine tool market is more active in the Pittsburg district. Varied reports are coming from the foundry trade. Some of the shops have all they can do and in certain cases are so rushed that they are anticipating their contracts for future pig iron. Other casting interests, which were operating very well when the resumption of iron and steel plants directed upon them a heavy volume of orders, are no more than in a comfortable position at present.

The Jamison Coal & Coke Co., Pittsburg, has increased its capital stock from $4,000,000 to $6,000,000. This company recently purchased large tracts of coal land in the Fairmont district of West Virginia, and is now actively improving the property by the sinking of shafts, which is preliminary to the eventual construction of large blocks of coke ovens.

An important crane contract just placed in this territory calls for five machines for the new Pittsburg warehouse to be erected by the Carnegie Steel Co. These cranes, which will be furnished by the Morgan Engineering Co., Alliance, O., constitute the principal mechanical equipment required. Later it is expected that several additional cranes will be needed.

Considerable foundry equipment will be required for the new plant of the Erie Engine Works, Erie, Pa., plans for the construction of which have just been announced. Two 66-inch cupolas will be installed in the foundry and there will also be two 30-ton cranes in this department. A ten-ton yard crane will also be needed. Later a machine shop will be built. F. Felkel, Pittsburg, is the engineer in charge of construction.

An unusually heavy demand for gas engines and mechanical stokers is reported by the Westinghouse Machine Co., and the largest part of this business is coming from manufacturing establishments, showing an encouraging revival in trade. Public utility companies are also important buyers at present. Within the past 30 days contracts have been closed for steam turbines with an aggragate horsepower of 45,000, and about 25 condensing equipments. Many of the orders call for low pressure turbines designed to utilize exhaust steam and regarded as a very economical power installation.

Contracts are now being awarded by the American Rolling Mill Co. for the extensive improvements to its plant at Middletown, O., which include billet and sheet bar, plate, jobbing and a number of finishing mills, and additional open-hearth capacity. Some awards were made in the past week and others are under advisement.

No contracts have yet been awarded by the Carnegie Steel Co. for the group of new merchant bar mills to be built near Girard, O. The plans have all been prepared and some definite action is expected to be taken shortly. The first unit to be constructed will consist of six mills.

CINCINNATI.

Demand for Heavy Machinery—New Industries to be Started.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Jan. 18.

The demand for machine tools during the past week has apparently kept pace with the recent record and there seems to be enough business coming along to maintain the generally cheerful tone noticeable among the manufacturers. The demand is becoming more general and several orders for radial drills and planers are reported, which is encouraging to the manufacturers of these heavy lines, which did not share in the activity with the lighter machines during the period of heavy automobile factory purchasing. The demand from the east has not yet developed to proportions hoped for, but reports from eastern agents are gradually more encouraging and it seems apparent that stocks in dealers' hands are working down to a point where new buying may be expected in the near future. Small lathes continue the most actively sought machines in this center. There is a fair demand for shapers. Milling machines are in good demand and it is only a question of deliveries with the manufacturers of this tool.

Plans are under way for extensions and additions to present plants and some new shops will probably be built during the summer.

The Kern Machine Tool Co. is building a new shop adjoining the plant now occupied on Spring Grove avenue. The new shop will contain about 15,000 square feet of floor space and will be used in building the new ball-bearing multiple spindle drills, which the company is to put on the market. The present plant is working full time and full force on upright drills and the demand for these machines continues active.

The annual meeting of the Industrial Bureau, which was held at the Business Men's Club, on Wednesday evening, Jan. 12, was, as usual, an interesting occasion to manufacturers. The report of Secretary Finch indicated the continued growth of Cincinnati as a manufacturing center and notably as a center for the manufacture of machinery. The report mentions that during the year the Toledo Electric Welding Co. removed from Toledo to Cincinnati. The Ohio Steam Shovel Co. was purchased outright by Cincinnati capital and brought to Cincinnati and established in a portion of the plant of the Cincinnati Equipment Co. Plans are under way for the organization of a new company to be known as the Cincinnati Steam Shovel & Dredge Co., and it is expected that the production of steam shovels and dredges on a large scale will begin here shortly in a plant especially prepared for the purpose. This will be a new product in machinery construction for Cincinnati. The new industries established by local capi-

tal include the Buckeye Products Co., making foundry supplies; the American Safe & Lock Co.; The Swing Electric Co., successors to the Barriett Electric Co., and the Burr Oak Belting Co.

The automobile industry gives promise of developing in this center. A number of local concerns which have been experimenting for some time with models have engaged actively in the manufacture of automobiles or automobile parts. These concerns are the Jewel Carriage Co., of Carthage; Haberer & Co., and the United States Motor Truck Co.

The report also mentions two important industries with which the bureau has been negotiating during the last half of 1909, one of which is a plant for the manufacture of large machine tools, of which there are at present but two in the United States. This enterprise is under contemplation by one of the wealthiest corporations of Chicago.

NEW YORK.

Inventory Taking Causes a Lull in Machine Tool Orders.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., Jan. 18.

In point of actual orders booked, the machine tool trade has found the past week extremely quiet, continuing the comparative inactivity which has prevailed since the beginning of the year. This is explained as being the customary lull incident to inventory taking and is in no sense alarming, as indications of improvement continue to develop and the volume of business which will be up for decision shortly is steadily assuming larger proportions. The current year will witness the extension of a good many machine tool manufacturing plants throughout the east, and in some important instances it is known that plans are under way for the construction of entirely new works.

Interest centers in the report, which apparently is correct, that the Marine Engine Machine Co., with a large plant at Harrison, N. J., has been acquired by the Otis Elevator Co. It is understood that this concern, which is an important factor in the elevator field, will be operated under its present name.

The Watt Mining Car Wheel Co., Barnesville, O., has secured the order for 150 steel mining cars recently inquired for by Phelps, Dodge & Co., for shipment to the Bisbee, Ariz., district. These cars are of 32-foot capacity and are equipped with roller bearings, being built from designs by the Copper Queen Co.

The New York Central evidently contemplates more extensive purchases of machine tools than was originally reported, as specifications on another list are now being prepared. Recently inquiries were put out for miscellaneous lots, chiefly for the West Albany shops, and some buying has resulted.

Louis Walber, who recently left the Hallidie Machinery Co., Seattle, Wash., to become connected in an official capacity with the Caldwell Bros. Co., of that city, has been in the east for some little time establishing agencies for the territory and visiting the trade.

Contracts have been awarded to William Steele & Sons Co., Philadelphia, for the erection of a seven-story brick and concrete addition to the lace plant of the Lehigh Mfg. Co., Twenty-first street and Lehigh avenue. The addition will be 78 by 444 feet and will cost over $250,000.

Considerable buying of machine tools will doubtless result from the destruction by fire of the Oriental Metal Bed Co. plant, Hoboken, N. J., the loss on which is estimated at over $200,000. Announcement is made that the work of rebuilding will be begun at once.

An inquiry from the Otis Elevator Co. for about $100,000 worth of machine tools is before the trade, chiefly for installation at its Buffalo and Newburg plants.

The Crocker-Wheeler Co., Ampere, N. J., has made another important sale of motors to the Bethlehem Steel Co., the latest order calling for five compound wound interpole motors with a total output of 3,600 horsepower and 19 mill motors with a combined capacity of 800 horsepower. This is in addition to 10,900 horsepower of Crocker-Wheeler motors already installed at South Bethlehem.

MILWAUKEE.

Shops Suffer Delay Because of Non-Arrival of Iron and Steel.

Milwaukee, Jan. 17.

Manufacturers at Racine, Wis., are complaining about a shortage of iron and steel raw material, which in some cases has delayed resumption of operations following the holiday shut-downs for repairs and inventory. The J. I. Case Threshing Machine Co. is awaiting the arrival of sixty carloads of iron castings and sheets and cannot re-open the sheet iron department until the material is at hand.

The J. M. Kohler & Sons Co., of Sheboygan, Wis., extensive manufacturer of plumbers' goods, sanitary appliances, etc., is making numerous improvements to its plant in addition to the new power house now being completed. An improved apparatus for molding bath tubs has been installed in the foundry, turning out nine tubs daily. A patent conveyor collects the sand, and carries it into hoppers where it is automatically screened and mixed. An overhead tramway carries the molten iron, which is also automatically poured. The casting is conveyed to the sanding room on a steel conveyor belt. An addition of 190 feet has been built to the yard crane tramway and an electro-magnet of one-ton capacity has been installed. The new power house will contain eight gas producers in addition to three now operating. Twelve 25-ton coke hoppers are being installed and patent stokers will be used.

The United States Standard Electrical Co., of Racine, Wis., recently acquired by the McCrum-Howell Co., of New York, has installed a new gas producer engine of 75 horsepower capacity. This is one of the first producer gas engines to be installed in Racine.

The Duplex Coil Co., of Fond du Lac, Wis., which recently announced its intention to add magnetos to its production, has installed several large machine tools including drill presses and screw machines, and the production of magnetos will begin about Feb. 15.

The Stevens Point Foundry & Machine Works, of Stevens Point, Wis., is building a brass furnace of 500 pounds capacity every three hours.

The British Columbia Electric Railway Co., which is extending its service at Vancouver, B. C., has contracted with the Allis-Chalmers Co., of Milwaukee, for two 2,000 kilowatt 1,800 revolutions per minute, 60-cycle, 3-phase condensing steam turbo generator units.

George C. Watts, who was instrumental in organizing the Aluminum Specialty Co., of Manitowoc, Wis., articles of incorporation for which were filed recently, has withdrawn from the concern and departed for his home in the east. Mr. Watts had been elected president. The withdrawal will not affect the future of the company. It is now negotiating for a building and when this is obtained, it is said that it will start operations without delay.

ORE TRADE CONGESTION

Follows Relief of Coal Famine at Bermuda.

Although the coal famine at Bermuda has been relieved, thereby releasing at least a dozen vessels bound for Baltimore and Philadelphia with Spanish ore, the delay has resulted in considerable congestion of unloading facilities at both ports, and it will be some little time before conditions are again normal. Also, as most of this ore is sold on an arrangement whereby payment is made on arrival, some financial hardships will be worked to eastern furnacemen on account of the simultaneous docking of several cargoes.

Ore interests are experiencing great difficulty in securing tonnage at reasonable figures. One local shipper has been delayed fully three months in starting a cargo of ore for which a speculative interest contracted to furnish a vessel. Spanish ores are rapidly advancing and Rubio is now held at 19s 6d or 19s 9d for immediate shipment and at 20s for first half delivery, though some of the leading interests refuse to quote. This represents an advance of fully 4s 6d in the past few months, and will result in advancing the price of British iron, as furnacemen there have covered generally for their first half requirements.

AVERY CO. PLANS LARGE ADDITIONS.

The Avery Co., Peoria, Ill., agricultural implements, gas engines, etc., is having plans and specifications prepared for the erection of an addition to its main factory, estimated to cost when completed and equipped $200,000. The main building will be 93 x 700 feet, and connected with the main building will be a wing 80 x 150 feet, of brick, steel or concrete, fireproof throughout. The main building will have a manufacturing bay 40 x 700 feet, 39 feet high, and two side bays, 24 feet wide, with a gallery over each. The central bay will have runways for two electric cranes, one 20 tons, with a 10-ton auxiliary hoist, and one 10-ton. The stock room wing will be served by a 20-ton crane. The central bay will be used for engine erecting and heavy machine tools; one side bay and auxiliary will be the machine fitting and metal shops, and the other bay will be the engine erecting and wheel shops. The erecting bay will be equipped with 15 hand cranes, a crane for each erecting floor. The new building will be well lighted, the sides of each bay having as much window space as can be crowded in. Plans are being hurried to completion, and it is hoped within a few days to ask for bids. It is planned to have the shops complete and ready to install tools by May 1.

NEW MINES OPENING.

Mining operations around Hibbing continue with great activity, notwithstanding the severe weather. In addition to the Uno and Dale properties, which, as already announced, the United States Steel Corporation is now opening, it has two other properties not yet named in sections 7 and 11, which it is getting ready to open. The section 7 property comprises 80 acres near the Leetonia, of which 40 is now being improved. It will be worked as an underground mine, and will probably not enter the shipping list before 1911. The second property lies near the Corrigan, McKinney Co.'s Stephenson mine, and may be a shipper this year.

Another new property is the Mandaria, not far from the Burt mine. This property is controlled by Archie Chisholm, R. B. Whiteside and others, under lease from the state of Minnesota. It is a small mine, and it was found upon ground which had been drilled unsuccessfully by the United States Steel Corporation. The Shenango Furnace Co., which controls the Webb mine, near Hibbing, is sinking a new shaft into that property, and is building a new dry house and a number of dwellings on the location. The southwest forty on the Webb property is to be stripped, which will make the pit practically continuous with the Sellers mine.

LACKAWANNA'S HALF-YEAR FIGURES SHOW REVIVAL'S PROGRESS.

The Lackawanna Steel Co. has submitted the following comparative statement of income for itself and subsidiary companies for the last six months of 1908 and 1909:

	For six months, ending Dec. 31. 1909.	1908.
Income from manufacturing and operating, after deducting all expenses, including maintenance, interest and fixed charges of subsidiary companies	$3,110,959.06	$1,283,249.58
Proportion of earnings on investments in companies not controlled and of other annual income	160,920.88	45,462.24
Total	$3,271,879.94	$1,328,711.82
Less charges and appropriations:		
Sinking funds on bonds of subsidiary companies	378,682.10	328,615.26
Mines exhaustion funds	147,271.10	74,779.60
Depreciation and accruing renewals	663,439.51	456,093.48
Total deduction	$1,189,392.71	$ 859,488.34
Net earnings	$2,082,487.23	$ 469,223.48
Deduct interest for six months on L. S. Co. bonds and notes, outstanding	813,750.00	750,000.00
Surplus for six months	$1,268,737.23	$ 280,776.52
	Gross tons.	Gross tons.
Unfilled orders at close of periods	467,533	205,236

FIVE HOT MILLS

To be Added to Plant of Youngstown Iron & Steel Roofing Co.

The Youngstown Iron & Steel Roofing Co., Youngstown, O., note of whose increase of capital stock was recently made, has approved plans for five additional hot mills and large extensions to the pressed steel department at the works at Haselton, O. President L. E. Cochran has announced that three mills, likely of the 3-high design, will be added to the sheet rolling department as soon as the weather will permit building, and that two other mills will be erected later. Projected extensions will more than double the output of the pressed steel department in which steel shapes are manufactured including metal lath, agricultural implement parts, etc. One of the proposed mills will be devoted to rolling hard steel which will be worked in the pressing department; another will work special steel, while the third will roll regular sizes. Originally organized and operated as a roofing plant, the company has steadily grown up to demands of increasing business, later adding six mills and last year adding two hot mills.

MIDVALE STEEL CO.'S ANNUAL REPORT.

At the annual meeting of the Midvale Steel Co., Jan. 11, Charles J. Harrah was elected president; James F. Sullivan, vice president, and H. M. Diemer, secretary, with the following directory board: Mr. Harrah, Mr. Sullivan, Alex Petre, Chas. B. Dunn and Howard Sellers. The annual report for the fiscal year ending Oct. 31 last showed net earnings of $555,347, leaving a surplus of $405,347 after the payment of dividends of 20 per cent. The report showed the company to be in a thoroughly prosperous condition and it is stated that order books are well filled.

COKE OUTPUT

FOR LAST YEAR WAS GREAT INCREASE OVER 1908,

But Records of Earlier Years Not Equaled—New Construction—The Failure of the Proposed Merger.

The total production of the Upper and Lower Connellsville regions for the calendar year of 1909 reached 17,785,832 tons, compared with 10,700,022 tons in 1908, a gain of 7,085,810 tons, according to the complete statistics compiled by the Connellsville *Courier*.

The coke output of the Connellsville regions in 1909 fell a little short of that of 1905, when 17,896,526 tons were produced, and was considerably less than during the years of 1906 and 1907, when 19,999,326 tons and 19,029,058 tons, respectively, were made. During the last half of the past year, however, production was at the highest rate in the history of the regions. A comparative table showing the output by half-year periods of 1909 and 1906, the year of greatest tonnage, is as follows:

	1909.	1906.
First half	7,344,035	9,783,269
Second half	10,441,797	10,216,057
Total output	17,785,832	19,999,326

The total shipments by months during the past year, from the main Connellsville and lower Connellsville regions, were as follows:

	Upper region.	Lower region.
January	767,256	438,394
February	723,257	420,230
March	787,836	397,978
April	747,178	397,573
May	799,616	435,428
June	949,294	479,995
July	1,054,068	551,869
August	1,086,274	555,013
September	1,110,801	594,118
October	1,168,343	633,101
November	1,168,373	667,372
December	1,154,677	677,788
Total	11,516,973	6,268,859

In the matter of prices the average figure realized from shipments made during the year of both furnace and foundry coke, according to the compilation was $2, ovens. On spot coke, the monthly average is given as follows:

Month.	Furnace.	Foundry.
January	$1.70	$2.10
February	1.65	2.00
March	1.55	2.00
April	1.43	1.90
May	1.45	1.85
June	1.50	1.85
July	1.55	1.85
August	1.75	2.00
September	2.30	2.50
October	2.80	2.75
November	2.85	3.00
December	2.85	3.10

The *Courier's* tabulated statement on the coke industry for period of 30 years, showing the oven capacity, production and average price realized, is as follows:

Year.	Total ovens.	Tons shipped.	Av. price.
1880	7,211	2,205,946	$1.79
1881	8,208	2,639,002	1.63
1882	9,293	3,043,394	1.47
1883	10,176	3,552,402	1.14
1884	10,543	3,192,105	1.13
1885	10,471	3,096,012	1.22
1886	10,952	4,180,521	1.36
1887	11,923	4,146,989	1.79
1888	13,975	4,955,553	1.19
1889	14,458	5,930,428	1.34
1890	16,020	6,464,156	1.94
1891	17,204	4,760 665	1.87
1892	17,256	6,329,452	1.83
1893	17,513	4,805,623	1.49
1894	17,834	5,454,451	1.00
1895	17,947	8,244,438	1.23
1896	18,351	5,411,602	1.90
1897	18,628	6,915,052	1.65
1898	18,643	8,460,112	1.55
1899	19,689	10,129,764	2.00
1900	20,954	10,166,234	2.70
1901	21,575	12,609,949	1.95
1902	26,329	14,138,740	2.37
1903	28,092	13,345,230	3.00
1904	29,119	12,427,468	1.75
1905	30,842	17,896,526	2.26
1906	34 059	19,999,326	2.75
1907	35,697	19,029,058	2.90
1908	37,842	10,700,022	1.80
1909	39,158	17,785,832	2.00

New Oven Construction.

New construction work in the Connellsville regions continued steadily throughout the year and the improved market conditions over the final four months proved a stimulus to plant extensions. Among the ovens finished during the year, were 186 at the new Royal plant of W. J. Rainey, in the Lower Connellsville field; 25 ovens by the Marion Coke Co.; 75 ovens by the Mt. Hope Coke Co.; 200 ovens by the Mt. Pleasant-Connellsville Coke Co.; and additional capacity at the Bridgeport plant of the H. C. Frick Coke Co and by the Rich Hill Coke Co. The Thompson-Connellsville Coke Co.'s twin plants of 400 ovens each were virtually finished during the year. Other construction now under way includes two plants of the Tower Hill-Connellsville Coke Co,, originally planned for 250 ovens each, but being built beyond this figure; 1,600 ovens for the Isabella-Connellsville Coke Co.; 600 ovens at the Allison plant of W. J. Rainey, and 400 ovens at the new Royal plant of the same interest. The Pittsburg Westmoreland Coke Co. is finishing 250 ovens in Washington county, and the Whyel Coke Co. is building 150 ovens in the Yukon field. The H. C. Frick Coke Co. in the year opened large bodies of coal at its Lambert, Filbert, Ralph and Sarah plants in the Lower Connellsville region. Three of these plants were originally designed for coking operations and one for a coal shipper, but the building of a large battery of by-product ovens at Gary has caused the company to abandon the plans for new oven construction in this part of the Connellsville region.

Relative to the proposed merger, the *Courier* comments as follows:

The story of the Connellsville coke trade of 1909 would not be complete without a brief mention of the rise and fall of the coke merger, which, though it died, did not live in vain, as time has shown.

With the exception of some of the larger interests which were tied up with trusteeships and other inhibitions upon selling or merging their interests, the independent operators generally joined in the movement and gave options on their properties extending to Oct. 1. Over 75 plants were considered and 60 of them actually appraised. Included in the merger as finally determined were 38,000 acres of Connellsville coal, 10,000 ovens built and under construction, and 8,000 acres of surface. The aggregate option price of the property aggregated $75,000,000. This was more than one-half of the coal acreage, one-half the number of ovens and one-half the value of the holdings of the H. C. Frick Coke Co.

In one important respect the merger materially benefited the coke operators. They were requested to make no contracts for the last half of the year, and many of them respected this condition to their profit.

MOTORS FOR BETHLEHEM.

The Bethlehem Steel Co., South Bethlehem, Pa., has ordered from the Crocker-Wheeler Co. five compound wound interpole motors with a total output of 3,600 horsepower, two of these machines having a capacity of 1,000 horsepower each at a speed of 285 revolutions per minute. The Bethlehem company has also ordered 19 mill motors of this make with a combined capacity of about 800 horsepower, these orders being an addition to the present equipment of 10,900 horsepower in compound-wound motors at Bethlehem works.

Other orders booked by this interest in the steel and manufacturing trade include two large alternation current motors for the Virginia Bridge & Iron Co., Roanoak, Va.; one large three-phase alternator for the Landes, Frary & Clark Co., New Britain, Conn., in addition to a 1,500 K. V. A. generator under construction for that interest; and two 250-volt direct-connected generators for the Flannerty Bolt Co., Bridgeville, Pa.

The annual stockholders' meeting of the Delaware River Steel Co. was held at Chester, Pa., Jan. 11, and resulted in the re-election of the official staff and directory board, with minor changes in the latter. The furnace will probably be started late this month; repairs have been completed and fires are already drying out the stack.

OUR FOREIGN COMMERCE

November Best Month of Year for Iron and Steel Exports—Year's Total Second to But Two Years—Some Non-Tonnage Lines Increase—Great Decrease in Locomotives—Pig Iron and Alloy Imports in Detail—Imports of Ordinary Pig Iron Begin in November—Record Ore Imports.

As noted editorially two week's ago, November, the latest month for which statistics are available, showed larger iron and steel exports than any preceding month in the year, The November total, covering scrap, pig iron, unfinished steel, finished rolled steel, wire products, structural material, pipes and fittings, etc., was 115,943 gross tons. The next largest month was June, with 114,721 tons. Should December show the same total as November, the year's exports would amount to 1,222,000 tons, the year being exceeded only by 1906 and 1907. The monthly movement since the beginning of 1907 has been as follows:

TOTAL IRON AND STEEL EXPORTS. GROSS TONS.

	1907.	1908.	1909.
January	102,630	74,353	70,089
February	64,728	81,773	84,860
March	112,787	96,681	94,522
April	132,792	93,285	100,903
May	91,543	64,020	109,977
June	92,996	69,779	114,721
July	122,249	86,806	100,670
August	118,792	86,244	105,694
September	114,819	76,727	97,387
October	123,170	85,668	110,821
November	116,308	71,028	115,943
December	86,019	77,636	.....
Total	1,301,979	964,266	1,105,701

Non-Tonnage Exports.

Estimating December, the total value of all iron and steel exports in 1909 should be about $157,000,000, against $151,000,000 in 1908. Inasmuch as the tonnage exports increased from 964,266 tons to about 1,222,000 tons, the non-tonnage exports, which as a rule constitute about two-thirds of the total iron and steel exports, showed a material decrease. This was by no means uniformly distributed. Comparing the first 11 months of 1908 and the first 11 months of 1909, the more important changes are shown below:

INCREASES.

	1908.	1909.
Cash registers	$1,941,179	$2,472,514
Mining machinery	3,482,885	4,068,458
Printing presses	1,421,634	1,625,549
Typewriters	5,667,150	6,693,444

DECREASES.

Electrical machinery	$6,369,163	$5,502,597
Metal working machinery	4,842,466	4,068,669
Locomotives	6,024,328	2,256,859
Stationary engines	2,955,905	2,645,395
Woodworking machinery	1,018,077	924,310

The most striking decrease was in locomotives, 62 per cent in point of value. The decrease in number was from 537 to 279, or 52 per cent.

Pig Iron Imports.

As has been noted from time to time in these summaries, the monthly government figures of "pig iron" imports include with ordinary pig iron the alloy metals forro-manganese, spiegeleisen, ferro-silicon, etc., and these imports, which ran about 10,000 tons a month during the first 10 months of 1909, comprised these special grades almost entirely, the quantity of ordinary pig iron being light. It was not until November that any important tonnage of ordinary pig iron was brought in. Quarterly the government compiles statistics of the imports according to grade. The figures for the third quarter of 1909 have been compiled within the past fortnight, and permit a summary of the movement in the first nine months of 1909. The imports by quarters have been as follows, in gross tons:

FIRST QUARTER.

Ferromanganese	21,420
Spiegeleisen	1,332
Ferrosilicon	2,621
Ferrochrome	46
Tungsten	0
All other	5,622
Total	31,041

SECOND QUARTER.

Ferromanganese	14,791
Spiegeleisen	182
Ferrosilicon	3,123
Ferrochrome	7
Tungsten	9
All other	6,275
Total	24 387

THIRD QUARTER.

Ferromanganese	23,813
Spiegeleisen	680
Ferrosilicon	5,215
Ferrochrome	103
Ferrophosphorus	31
Tungsten	22
All other	12,116
Total	41,980

The total of the above figures, for the first nine months of 1909, is 97,408 tons. The total of the monthly figures, usually the basis of these reviews, is 99,823 tons for the nine months, the difference in the two sets of figures being that the monthly figures are those of "general imports," i. e., entries for consumption and entries for warehouse, while the quarterly figures given above are "imports for consumption," i. e., entries for consumption and withdrawals, the two sets of figures varying, in any period, by the amount that warehouse stocks vary during the period.

The imports of "all other" pig iron have been as follows:

First quarter	5,622
Second quarter	6,275
Third quarter	12,116
Total	24,013

Such imports are, of course, inconsequential. In the third quarter, when 12,116 tons of "all other" pig iron were imported, the imports of ferromanganese, spiegeleisen, ferro-silicon, ferro-chrome, ferro-phosphorus and tungsten amounted to 29,864 tons, practically at the rate of 10,000 tons per month. Such a movement may be assumed to have continued through the fourth quarter, if indeed there was not an increase in these alloys. Assuming the rate to have been unchanged, the 11,851 tons of all grades imported in October indicates that the imports of ordinary pig iron were negligible, but the imports of 34,707 tons of all grades in November indicate the probability that nearly 25,000 tons of ordinary pig iron were imported in that month. November, then, marks the real beginning of the import movement in ordinary pig iron. Whether it will continue remains to be seen. There is, at any rate, no prospect that the movement will be of anything like the importance of the two preceding movements, in 1902-3 and 1906-7 respectively, when imports rose to average rates of 100,000 tons and 50,000 tons respectively per month.

Heavy Ore Imports.

The most interesting feature of the import movement is in iron ore. The imports in the first 11 months of 1909 amounted to 1,473,812 tons, or more than in any full calendar year previously. Ore imports by months in 1909 were as follows, in gross tons:

January	105,233
February	61,749
March	108,676
April	74,782
May	97,393
June	124,714
July	172,316
August	209,855
September	164,613
October	179,505
November	174,976
Eleven months	1,473,812

Iron ore imports in the past six calendar years have been as follows:

1903	980,440
1904	487,613
1905	845,651
1906	1,060,390
1907	1,229,168
1908	776,898

The imports in the 11 months of 1909 were drawn as follows:

Europe	411,522
British North America	209,376
Cuba	809,935
Other countries	42,979
Total	1,473,812

IRON AND STEEL EXPORTS, GROSS TONS.

	November,		Eleven months ending November.	
	1908.	1909.	1908.	1909.
Scrap	1,008	820	20,991	24,957
Pig iron	4,875	9,168	41,964	57,923
Billets, sheet bars, etc.	9,432	2,715	104,284	101,237
Wire rods	839	3,362	6,500	17,781
Rails	10,805	34,569	186,267	246,389
Structural iron and steel	6,416	7,680	106,943	82,153
Bar iron	1,323	627	7,675	12,286
Steel bars	3,017	7,628	39,289	67,097
Sheets and plates	8,507	17,678	93,564	159,041
Tin plates	121	741	11,594	8,197
Hoop, band and scroll	212	584	3,885	3,256
Wire	13,052	12,509	114,191	136,358
Wire nails and spikes	1,610	2,905	23,178	27,670
Cut nails and spikes	339	1,432	6,288	9,231
All other including tacks	466	497	4,671	6,750
Pipes and fittings	9,108	13,028	105,296	145,375
Totals	71,130	115,943	886 580	1,105,701

IRON AND STEEL IMPORTS, GROSS TONS.

	November,		Eleven months ending November.	
	1908.	1909.	1908.	1909.
Scrap	281	15,902	4,029	41,424
Pig iron	8,489	34,707	81,872	146,381
Billets, bars and steel n. e. s.	1,247	1,030	9,008	14,400
Wire rods	1,054	439	10,557	9,953
Rails	350	43	1,671	785
Structural	654	298	2,953	5,625
Bar iron	2,764	2,554	18,564	16,523
Sheets and plates	259	898	2,235	3,955
Tin plates	4,647	8,046	56,015	57,398
Totals	19,745	63,917	186,904	296,444

SWEDISH IRON STATISTICS.

The Swedish Iron Works Corporation reports exports of iron and steel for the first ten months of the year as 252,900 tons, against 276,300 tons during the same period in 1908. This total included 87,700 tons of pig iron, 7,300 tons of ingots, 14,800 tons of blooms and natural bar iron, 87,700 tons of iron bars, 16,700 tons of wire and 14,100 tons of billets and tube blanks. Despite the strike, production during the first nine months of the year was 444,500 tons of pig iron, or 17,300 tons more than during the same period in 1908. All forms of semi-finished and finished material, however, showed a sharp decrease and stocks of railroad Swedish iron and steel both at home and abroad have been exhausted.

MAXIMUM OUTPUT

Of Connellsville Coke Field Maintained—Revised Oven List.

Practically maximum production in the Connellsville coke regions continues to be maintained, and it is not believed there will be any upward change in ouput until possibly spring, when some new construction will be completed. The Coke Producers' Association, in its report under date of Jan. 12, makes interesting comment upon the present active capacity of the upper and lower districts. It is as follows:

The reports we have of coke oven operations show at the end of last week that the number of active ovens in the two districts has practically reached the maximum, and barring the usual shortages in production at this season of the year, due to weather conditions, production can also be said to practically have reached the maximum.

The number of ovens in the two districts at the beginning of the year has been revised and "dead" ovens eliminated. The revised list shows a total of 37,618 completed and now available, or will be with the development of the coal. Of this number 36.256, or 93.7 per cent, are now active, and 1,362 are idle, of which likely not more than 400 could be put into service in the near future, owing to lack of development at several places and to the condition of the ovens at other plants. Progress on the construction of the new ovens has been retarded by the weather, and it is likely that but few, if any, will be ready for operation before spring.

Production for the week is conservatively estimated at 449,471 tons.

The Frick Coke Co. is reported to be operating its ovens in full.

Of the ovens belonging to the furnace interests, 93.5 per cent of capacity are active, of the Rainey interests, 83 per cent, and of the other independent concerns, 96.4 per cent.

Shipments by way of the three railroads to Pittsburg and points west for the week were 12,846 cars, as compared with 11,907 cars shipped the preceding week.

The car supply for the week was better than for some time. The labor situation is no worse.

NEW SALES MANAGER.

John M. Reeves, formerly of the Cumberland Nail & Iron Co., has assumed the position of sales manager of the Longmead Iron Co., Conshohocken, Pa., succeeding P. N. Guthrie Jr., who will represent the company in New York City and the metropolitan district with offices at 30 Church street, New York. John B. Guthrie will continue in charge of the company's offices in Pittsburg and adjacent territory with headquarters at the Columbia Bank building, Pittsburg, T H. Speddy & Co., with offices in the Balboa building, San Francisco, will remain the company's representative on the Pacific coast. The representation at Savannah, Ga., has been discontinued for the present.

FORMAL PASSING OF TITLE.

Deeds have been filed at Uniontown, Pa., showing the transfer by the Clairton Steel Co. of 2,644 acres of coking coal and 296 acres of surface land in Luzerne township, Fayette county, to the H. C. Frick Coke Co. The consideration is given as $2,284,448. This is merely a formal action, as the property has been owned by the United States Steel Corporation for several years, having been included in the purchase of the Clairton Steel Co. Title is now given to the H. C. Frick Coke Co., the coke subsidiary of the United States Steel Corporation.

ADVANCE IN FLUORSPAR.

A brisk demand for fluorspar, coupled with considerable interference with early deliveries on account of ice in the Ohio river, has resulted in rather sharp advances on domestic spar and prices are now rather irregular. Dealers report a steady increase in consumption, steel works now using large tonnages, and the effect of the tariff changes was to turn all this business to domestic miners, so long as a reasonable figure is quoted. Recently sales of 600 tons and 1,000 tons have been made to leading steel works, the price reported being $6, f. o. b. cars at mining point for washed lump. One large interest is holding at $5.50, but cannot ship at present because of navigation being suspended in the Ohio, and has even been unable to keep up with some of its contracts. Another interest having a good tonnage stored at a railway siding advanced its prices for early delivery to a level permitting the importation of foreign spar and was forced to make a reduction. As a general thing, the larger producers are sold several months ahead and are not anxious for further business. Ground material is held at about $10, mining point. It is anticipated that complete returns will show production during 1909 to have been the largest on record.

The Republic Iron & Steel Co. has blown out No. 1 stack at Thomas, Ala., for relining.

A NEW JIG BORING MACHINE.

The accompanying views illustrate a plain milling machine designed and built by the R. K. Le Blond Machine Tool Co., for use in its tool room, in the manufacture of jigs and fixtures. The spindle is unusually heavy. The front bearing is tapered and runs in a cast iron box of special mixture, insuring a bearing that will run almost indefinitely, and with little attenton. The rear journal is parallel and runs in a bronze bearing fitted to a taper hole in the housing, and which can be drawn into the taper to take up wear. The end thrust of the spindle is taken by a hardened steel and a babbitt collar. The arbor is driven by a clutch milled in the nose of the spindle. An arbor bolt is provided, which extends through the hollow spindle, and provides a convenient means of inserting and removing the arbors. The cone is three-stepped, for 3½-inch belt.

The back gears are of the well-known Le Blond double friction type, which, in addition to the advantages of double back gears, provides a means for quickly stopping and starting the machine, a feature of equal value to the friction head on a chucking lathe.

The feed box is driven direct from the spindle by spur gears, avoiding all bevels or chains, and thus reducing the friction of the feed mechanism. Sixteen changes of feed are obtained by a system of tumbler and sliding gears, with only two operating levers, which are close together, and their movement is such that a direct reading index plate enables the operator to tell at a glance the correct position for a given feed. The table feed is driven by a direct spur drive on the end of the saddle, instead of the usual drive through the center of the knee and saddle, further reducing the frictional losses in the feed mechanism. The reverse and trip for the table feed are operated by one lever, the mechanism being carried in a box on the end of the saddle. When the feed is tripped there are no gears or clutches running idle on the screw or in the saddle.

The table is unusually heavy, with the bearing on the outside of the dovetail and extending the full width of the table. Large oil pockets extend entirely around the table, with drainage cocks at each end.

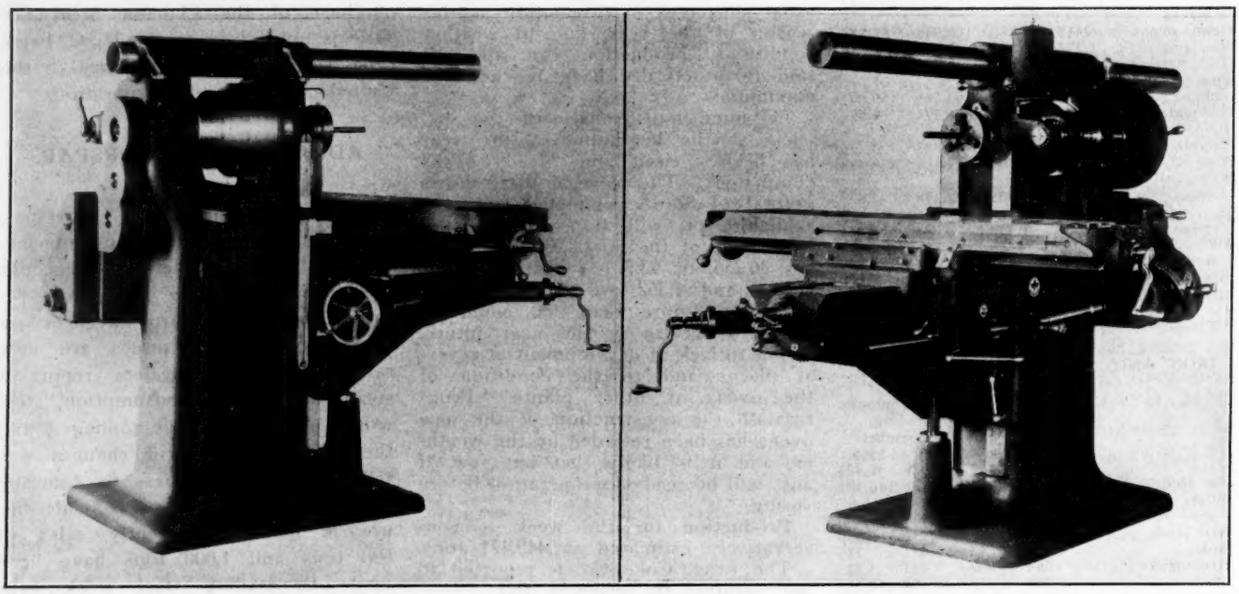
The table feed screw is 1¾ inches in diameter, of coarse pitch, and geared two to one on the quick return, and with ball thrust bearings at the ends of the table, and the screw is therefore always under tension regardless of the direction of movement. The knife is of box section, ribbed and braced transversely and laterally. The column bearing extends almost to the top, and the saddle bearing is wider than the column bearing, giving support to the ends of the saddle. The cross feed screw is set in the center of the knee, avoiding side strains and giving an easy movement.

The saddle is braced its entire length with arched ribs through which the table screw passes. The taper gib for the table bearing is tongued to avoid any tendency to lift, and the lower gib as well as the gib on the column bearing is made with two angles, adjustment being made by fine-thread screws. Locking screws with fixed handles are provided on both gibs, providing metal to metal contacts the entire length of the gib.

The machine has a longitudinal feed of 34 inches, a vertical feed of 20 inches, and a cross feed of 18 inches. The unusual length of the cross movement is the chief advantage over an ordinary plain miller for boring jigs, as it permits the use of long boring bars for box jig work and for deep holes. In order to use the machine to the best advantage in boring the cross feed is so arranged that its movement can be controlled from the rear of the table, a position most convenient to the operator. This is accomplished by the introduction of the diagonal shaft through the knee, which is connected to the cross feed screws at the front by means of bevel gears.

The longitudinal and vertical movements are fitted with vernier scales 24 inches in length, thus enabling the operator to lay off centers with extreme accuracy without the use of auxiliary measuring instruments.

An interesting feature in connection with the completion of this machine was the testing of the accuracy of the screws. The vernier scales provided an ideal condition for such a test, which showed the screws to be so perfect that no inaccuracy was visible to the naked eye in a length of 20 inches.



JIG BORING MACHINE BUILT BY LE BLOND MACHINE TOOL CO., CINCINNATI, O.

THE EFFECT OF SUPERHEATED STEAM ON CAST IRON AND CAST STEEL FITTINGS*

A Symposium of Three Papers on This Subject, Entitled "Cast Iron Fittings for Superheated Steam," "The Effect of Superheated Steam on the Strength of Cast Iron, Gun Iron and Steel" and "Cast Iron Valves and Fittings for Superheated Steam"—Causes for the Failures of Castings in Service

CAST IRON FITTINGS FOR SUPERHEATED STEAM

By Ira N. Hollis.

The failure of a number of large cast iron fittings in use with superheated steam has rightly created a widespread suspicion of this material when exposed to high temperature. Yet, on this subject there is very little information of a character to justify the wholesale substitution of steel castings for the ordinary heavy cast iron fittings. The latter have been used with success for many years at all degrees of temperature below actual redness, and in many stations now in operation with moderate degrees of superheating, say 100 degrees Fahr., cast iron has never given the slightest trouble beyond the ordinary wear and tear.

The doubt as to the reliability of cast iron has seemed to spring up with its use in long pipe lines to steam turbines where the temperature has ranged from 550 to 600 degrees. This would lead one to ask if the difficulty has not been in the design of the piping systems rather than in the character of the material. Has not the cast iron taken the brunt of a new service and has it not suffered in the estimation of the engineering public because the conditions of that service were not fully understood?

A vast amount of experiment and investigation would be required for the satisfactory reply to this question, and this brief paper is not intended as a reply, but rather to place before the Society a record of some tests that may throw light on the subject. These tests were made for the Edison Illuminating Co., Boston, for the purpose of determining the bursting strength under hydraulic pressure of some large fittings which were replaced with steel castings.

It may be well before giving the result of the tests to inquire what is actually known about cast iron subjected to high temperature; that is, known without the possibility of controversy:

a Fittings have developed cracks and small changes of shape after a few months of actual service.

b Fittings exposed separately to superheated steam at a temperature exceeding 500 degrees Fahr., have shown a permanent increase of some dimensions.

c The tensile tests of pieces cut from fittings that had failed in service indicate in some cases the possibility of permanent loss of strength.

The remainder of the evidence in the case may be classed as good guesswork, based upon some preconceived theory as to the behavior of the constituent parts of cast iron in a rising temperature.

One of the curious and interesting qualities of cast iron is its permanent increase of dimensions under high temperature. This is paralleled by the permanent set of cast iron test pieces when subject to very moderate tensile stresses. In both cases the cast iron apparently continues to grow at a decreasing rate, at least in some dimensions, when the high temperature or tensile stress is repeated.

How long this growth would continue is not known. Its probable limit is the flow of the material under the ultimate breaking stress. Cast iron may not be peculiar in this respect and all materials may change permanently their dimensions under moderate stress, the change growing with each imposition of the same stress. There is no doubt of this where the yield point has been exceeded. It may also be that all materials change permanently under repeated application of high temperature.

Cause of Persistent Expansion.

The cause of the persistent expansion under high temperature is very hazy, but two possible agencies have been mentioned in a number of discussions:

a A chemical, or physical, change in the relation of the iron to the various foreign substances, which fix it as cast iron.

b A molecular change due to the fact that cast iron has no well defined elastic limit or modulus of elasticity.

Both causes may be in operation at the same time, but the theory of chemical change has far less standing than that relating to the stresses produced by unequal expansion. While there is a temperature at which carbon changes its relation to the iron, superheated steam is probably well below that point except under very unusual conditions.

Loss of Strength Not Conclusive.

That cast iron loses strength, when exposed to superheated steam at 600 degrees, is not conclusively proved. The most that can be said is that test specimens taken out of cast iron fittings after one year's or more exposure to a temperature of 550 to 600 degrees have shown a surprising irregularity of strength in the same casting. But there is nothing to prove that new cast iron fittings have not a great lack of homogeneity. Irregularities exist in every casting owing to the inability of the metal to flow when cooling below a certain temperature. Furthermore, the strength of a test piece cast from a given heat can rarely be taken as that of any selected part of the fitting cast from the same heat. It is common experience to find variations of strain in castings as well as variations of texture. Were any large, irregular casting cut into small pieces, the variations of strength would probably be found to be quite as great as that reported later on in this paper. The demonstration of the loss of strength after long service with superheated steam does not seem either complete or conclusive.

A very brief description of the essential features of the Edison station will help to make clear what follows.

*Presented at a meeting of the American Society of Mechanical Engineers, held at the Edison Auditorium, Boston, Mass., Dec. 17.

The new part of the station is arranged in a series of complete units, each consisting of one vertical Curtis turbine and eight boilers set in pairs. The main steam line extends along the rear ends of the boilers just beneath the brick work, four 8-inch vertical steam mains connecting each pair of boilers with the main line. Three of the vertical mains discharge through gate valves into T's, and a fourth, at the end of the line, through a gate valve into a bend.

The first turbine units were provided throughout with cast iron fittings, which were ultimately replaced with steel fittings. No expansion or slip joints are used. The main steam line (something over 103 feet long) is anchored at the turbine end and is allowed to expand freely in a longitudinal or horizontal direction, carrying the lower ends of the vertical mains with it. The steam pressure is 175 pounds, the superheating generally amounts to 150 degrees Fahr., although it is not constant. The actual temperature of the steam varies from 500 to 580 degrees, so that the main line is changing in length from time to time, thus moving the lower ends of the vertical mains back and forth. A series of variable stresses are consequently introduced into all parts of the pipe system, probably affecting most seriously the T's. It is this aspect of the case, namely, the effect of varying stresses upon cast iron at high temperature, that must be studied before a sound verdict can be reached.

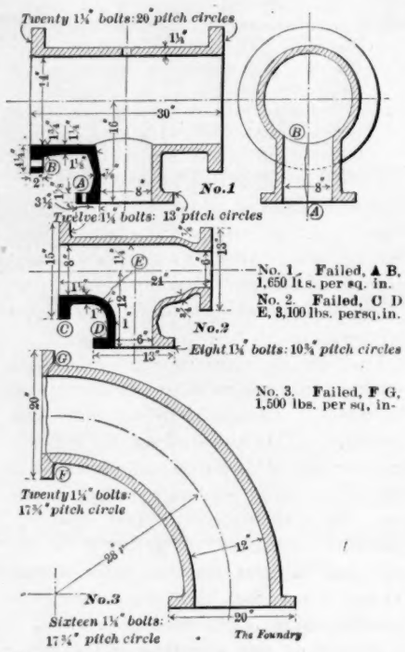
Failure of Castings.

The castings in the South Boston station were first suspected of failure when nearly a year after the turbine plant had been in operation one of the 8 x 6 x 6-inch T's near the boiler showed signs of deterioration, cracks appearing near the junction of the offset with the body of the T and in the flanges. Another fitting of the same dimensions and location began to fail and was taken out after 14 months' service. Both these T's were cut up for testing and the results were so much alike that only the second is given here, as that T had been exposed the longest to the strain.

A chemical analysis gave the following: Carbon, 3.47 per cent; manganese, 0.10 per cent; phosphorus, 0.366 per cent; sulphur, 0.062 per cent; silicon, 1.41 per cent. The tensile strength of six pieces taken from different parts of the T was found to be, 12,646, 14,295, 26,080, 27,270, 27,440, 28,280 pounds per square inch. There thus appears to have been considerable variation of strength in the T unless the first two results are errors due to some faults in testing. Not considering them, the four other pieces do not appear to indicate any great falling off in service. They are as near together as would commonly be found in cast iron from the same heat. The material was supposed to be a first-rate quality of air-furnace gun iron, which should have been good for 25,000 to 30,000 pounds per square inch, but no tests or analyses of the heat from which this T was poured are on record.

Tensile Tests.

Four test pieces cut from a larger T, 14 x 12 x 8 inches, which had had about the same service as that from which the foregoing test pieces were cut, gave a tensile strength of 23,130, 23,480, 23,875, 24,170 pounds per square inch. Here again there was absolutely no proof that the material had deteriorated.


Twenty 1¼" bolts: 20" pitch circles
No. 1
Twelve 1¼" bolts: 13" pitch circles
No. 1. Failed, A B, 1,650 lbs. per sq. in.
No. 2. Failed, C D E, 3,100 lbs. per sq. in.
No. 2
Eight 1¼" bolts: 10¾" pitch circles
No. 3. Failed, F G, 1,500 lbs. per sq. in.
Twenty 1¼" bolts: 17¾" pitch circle
No. 3
Sixteen 1¼" bolts: 17¾" pitch circle
The Foundry

THREE CAST IRON FITTINGS USED IN SUPERHEATED STEAM SERVICE, SHOWING POINTS OF FAILURE UNDER HYDRAULIC PRESSURE

Three test pieces were taken, for comparison, from a large manifold which had been seven years in service with saturated steam, and the tensile strength was found to be 16,413, 16,550, 17,000 pounds per square inch. The nature of the cast iron was not known positively, but it was bought as air-furnace gun iron.

It was fully recognized in the first of the foregoing tests that, while the material might not have suffered in service, nevertheless parts of the casting might have been weakened by the expansion stresses. For the purpose of testing this, two T's were removed from the line and broken by internal hydraulic pressure, thus affording a definite idea of the strength of the castings as a whole. A third casting, an L not previously in use, was added for comparison. The three fittings are shown in the accompanying illustration, in which the measured dimensions and the location of the fractures are given.

The material was the same as that used for all the fittings of the turbine unit, air furnace gun iron, and the chemical constituents were probably about the same. The two T's had been exposed to superheated steam of 578 degrees Fahr. and less for fifteen months, or longer, and when removed had given no indications of weakness. A careful examination disclosed no appreciable distortion except in the faces of the flanges, which were no longer plane surfaces. There were several high spots that could not have existed when the flanges were faced-off.

Description of Defective Castings.

No. 1 was a 14-inch T with an 8-inch offset. The openings were closed by heavy cast iron plates fitted to the flanges and bolted. The pressure was produced by a steam-driven, outside-packed plunger pump, and was measured by means of a small conical safety valve, one-tenth of a square inch in area, and directly loaded by dead weight applied as the pressure increased. The indications of the small valve were constantly compared with a hydraulic gage previously tested and calibrated. The fitting broke as shown at an internal pressure of 1,650 pounds per square inch. The plates covering the openings did not reinforce the T to any great extent, as the bolts were smaller than the holes and the joints around the flanges were leaking appreciably when the fracture occurred.

No. 2 fitting was an 8 x 6-inch T. It was broken in precisely the same manner as No. 1 and gave way at an internal pressure of 3,100 pounds per square inch.

No. 3 fitting was a 12-inch L. Its two openings were closed with cast iron plates and it was burst in the same way as the others. The joints practically gave out at a pressure of 2,000 pounds per square inch, although the pressure was kept on for some minutes. For the second attempt to run the pressure up, the bolts were set up with a very heavy wrench, which undoubtedly put a bending moment on the flange. The fitting finally parted all around the

root of the flange at a pressure of 1,500 pounds per square inch.

Test Pieces.

Four test pieces were cut from the larger T and broken under tensile stress. Their dimensions were almost exactly ¾ inch in diameter by 6 inches between fillets. Two of them were broken cold and gave a tensile strength of 22,150 pounds per square inch, and two were broken at a temperature of 590 degrees at 20,050 pounds per square inch. The temperature of the latter was maintained by means of a cylinder-oil bath, the oil being placed in a large tube surrounding the test piece and kept hot by a gas flame.

No information could be obtained as to the original strength and chemical composition of the iron and it would be impossible to prove that it had changed either in strength or in composition. There is ground, however, for believing that it had changed, as the smaller T mentioned gave as high as 28,000 pounds tensile strength in one specimen.

Formula for Bursting Strength.

A comparison of the larger T with those tested and reported in the *Valve World* for November, 1907, throws an interesting light on the subject. The formula there published as derived from a very large number of tests of cast iron and ferro-steel fittings may be taken as a basis for calculating what should have been the bursting pressure of the 14-inch T.

This formula is $B = \frac{T}{D} \times S$, where

D = inside diameter of the T
T = thickness
S = tensile strength of the material multiplied by 60 per cent
B = bursting pressure in pounds per square inch.

Taking the tensile strength of the cast iron when hot at 20,000 pounds per square inch, the diameter of the T at 14 inches and the thickness at 1¼ inches, the value of B is 1,070 pounds per square inch whereas the T actually burst at 1,650 pounds. This did not seem to indicate weakness or deterioration.

It is interesting to inquire here what stress existed in the T during its service. That due to the steam pressure was small when compared with the actual bursting pressure, but that due to expansion may have been serious in its effect. The first T in the main steam line was located at 4 feet, 8⅝ inches from the anchorage, the second 37 feet, 8⅝ inches, the third 70 feet, 8⅝ inches, and there was no expansion joint to ease off the pressure on the vertical mains. Taking the third T for purposes of illustration, certain suppositions can safely be made:

a The lower flange of the vertical pipe moves in a horizontal plane as the main pipe expands and therefore the lowest point of the axis of the pipe moves parallel to itself.

b The upper end of the vertical pipe is practically fixed. The expansion of the main steam pipe thus puts an S bend in the vertical pipes and introduces large bending movements into both ends of it and into the T. The actual length of the pipe between its lowest flange and the upper end is 26 feet, but the length between the upper surface of the T and the upper end of the pipe is about 28 feet.

The linear expansion of the main steam line is about 3 inches when heated to 578 degrees Fahr. The effect of this is supposed to be halved by cutting the pipe short and springing the flanges into place when making the joints. There is thus an initial deflection in the vertical pipe. This is overcome as the pipe is heated and carried as much farther on the other side.

The value of the deflection in the lower end of the pipe is then taken at 1.5 inches. The formula for the maximum deflection of a beam fixed at one end and moved parallel to itself at the other end is

$$Y = \frac{Wl^3}{12\,EI}$$

W = load in pounds or push of the horizontal pipe.
l = length in inches.
E = modulus of elasticity.
I = moment of inertia of the pipe.

The inside diameter of the pipe is 8 inches and its thickness is 0.322 inches giving the value of $I = 72.5$. E is taken at 30,000,000.

The equation for the deflection is then

$$1.5 = \frac{312^3\,W}{12.725 \times 30{,}000{,}000}$$

and W is found to be 1,288 pounds. Thus if the expansion of the pipe is exactly split by cutting the main line short, the push on the lower end of the vertical mains is 1,288 pounds. The point of contrary flexure in the S bend of the pipe is about 179 inches above the junction of the offset of the T with its main body. The bending moment in the offset of the T is therefore 1,288 × 179 inch-pounds and the stress set up is

$$S = \frac{Mc}{I} = \frac{1288 \times 179 \times 5}{290} = 3{,}975 \text{ pounds}$$

While this calculation is not entirely reliable on account of the uncertainty as to the elastic curve of the vertical pipe, nevertheless it is a fair indication of the stress to be expected in this T when the temperature of the pipe reaches 578 degrees. Furthermore, it is made under the supposition that the expansion of the pipe was lessened by an initial pull and that all the joints came exactly fair before setting up the bolts. It is easy to imagine how serious the stresses might have become under actual conditions of inaccurate fitting. The one element of splitting the expansion is very uncertain. The foregoing stress might easily have been doubled, resulting in pulling the T quite out of shape and in setting up internal strains certain to weaken the material in places.

Use of Cast Steel.

Under such conditions, it was, and would generally be, wise to replace the cast iron T's with cast steel which would yield more readily to expansion and which would be safer at much higher tensile stresses. The reason for the substitution ought not to be lost sight of in such a case, if cast iron is to be judged fairly. It is made because it is cheaper on the whole to replace the cast iron with steel rather than to put in expansion or slip joints. Perhaps the steel casting is also much easier to take care of than any form of expansion joint. The unreliability of cast iron in such a service has nothing to do with the case; it is merely that the design usually adopted for steam piping does not quite fit cast iron.

CAST IRON VALVES AND FITTINGS FOR SUPERHEATED STEAM

By Arthur S. Mann.

THERE have been many failures of cast iron valves and fittings in piping systems carrying steam of high pressure and high superheat. The ordinary, extra-heavy flanged cast iron fittings which are listed in many manufacturers' catalogs as suitable for 200 pounds pressure and which have to meet a close price competition, have successfully carried a pressure perhaps as high as 150 pounds or more. No doubt the fittings and valves can support a steady pressure of 200 pounds without bursting, but there have been many failures when carrying superheated steam of lower pressure.

These fittings are not too well suited for permanent work of even 150 pounds pressure, and many engineers in control of such matters in stations of a representative type prefer to design their own parts rather than to trust the usual run of commercial, extra-heavy fittings.

Probably on account of the advertised ability to support a high steady pressure, these extra-heavy fittings and valves have been used in a number of instances for superheated work. After a short time, six months or even less perhaps, cracks make their appearance; valves leak, seats become loose, castings grow in length and surface cracks become so large in size and in number that the casting is removed from the line.

A few repetitions of this experience seem to justify the conclusion that cast iron is not fit material for high-temperature steam. The natural substitute is steel, which is used with fair, even complete success in many cases.

Effect of Repeated Heatings.

It is known that cast iron will grow with repeated heatings and coolings, often observed in the ordinary straight grate bar. When the bar is first heated it expands and cools as it contracts; but if the temperature has been high, the bar will increase in length. With a second heating, a further increase takes place, followed by many others. As a consequence the long single, straight, flat grate warps and proves the wisdom of McClave's rule, "Keep your long lines of metal away from the fire."

This subject of growth has been treated very thoroughly by Outerbridge in his excellent paper published in the *Journal of the Franklin Institute,* February, 1904. Mr. Outerbridge heated his samples to redness or above, temperatures greatly exceeding that to which a steam-pipe fitting is subjected.

A rough experiment on this line was tried by the writer with two samples, one of an ordinary cast iron and a second of a high grade cast iron, which has proved itself capable of carrying superheated steam and of which a detailed analysis is given later in this paper. The two samples were each 6 inches long and 1 inch in diameter. They were placed in a banked fire over night, reaching a dull red heat, and were allowed to cool in the air. A slight growth as measured by micrometer was found in each piece.

This treatment was followed for two or three nights and the growths were measured. There was an increase in the length of each of the samples, the high grade iron having increased in length slightly more than did the ordinary iron. The experiment so far as it went tended to show that the growth of cast iron does not necessarily unfit it for the usual degree of superheat in power house work.

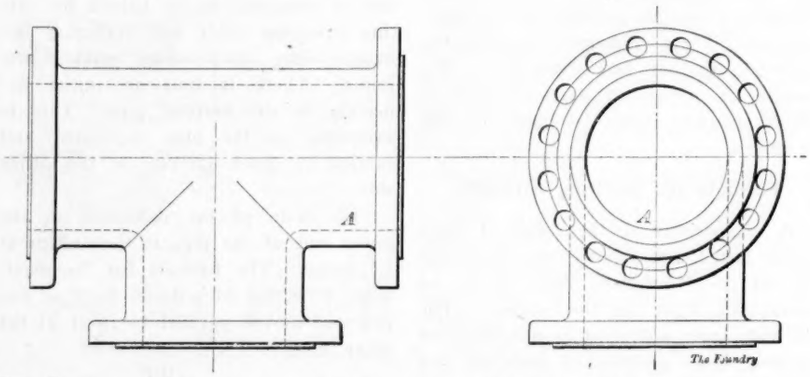
Use of Brass Castings.

Many grades of brass will crumble when heated in a forge to a barely visible red, and are quite unfitted to support any stress at such a temperature. But this characteristic in no way unfits very ordinary cast brass for saturated steam work, and one should not hesitate to use a valve of cast brass up to 3 inches in diameter for 150 pounds saturated steam pressure. Three inches is not usually exceeded because values of large brass bodies are expensive.

Articles have appeared in various publications showing the disability of cast iron, tensile tests being made before and after the use of fittings of ordinary iron. Cases of bronze seats dropping from valves were cited and it was not difficult to prove that something better than ordinary cast iron was needed for steam of 180 pounds pressure and 250 degrees superheat. These failures came from two causes. In the first place, the iron itself was not of sufficiently good quality; and, secondly, the parts were not thick enough. The static stress probably did not exceed 1,000 pounds in the body; but the static stress is not the important load which fittings have to support.

Stresses from expansion and contraction within and without the casting and stresses from pulling up joints no doubt greatly exceed the static load even in pipe very carefully erected. The troubles are aggravated by the action of the steam, but it is yet to be proved that the steam or its high temperature will of itself start cracks in a properly designed fitting.

The ordinary commerical, extra-heavy flanged T, 8 inches inside diameter, has a body 7/8 inch and flanges 1 5/8 inches thick. It is made of common iron, having a tensile strength of about 18,000 pounds. Such a fitting will fail with superheated steam at 175 pounds pressure and 200 degrees superheat. Within a year the inner surfaces will have a network of cracks, some of which will increase in depth till they extend through the body. The flanges will crack outward from the bolt holes and the fitting will become not only leaky, but dangerous as well. The writer has observed just such castings, an analysis of some of them being given later in this paper. Similar effects have been experienced by a great many steam users. The fittings are inherently weak to begin with, so that the failures do not prove that a heavier fitting of better iron is unsuited for superheated steam work.



THE LINE AT *A* SHOWS POINT OF FAILURE OF A 10-INCH, STEEL FITTING IN SUPERHEATED STEAM SERVICE

Failure of Steel Fittings.

Within the experience of the writer steel fittings have failed with superheated steam. Out of 25 steel gate valves, 6, 8, and 10 inches in diameter, not more than four were fairly tight after one year's service, the bodies themselves yielding enough to leak badly. Some defects in the castings developed, allowing steam to pass straight through the walls, when they left the foundry. Some of these defects were such that the fittings and valves could not be repaired. In some cases, seats were scraped in once or twice and holes were plugged up or patched, but the material would not have been satisfactory without this working over. Yet all these castings were heavy, materially thicker than the commercially extra-heavy cast iron product, and had passed a rigid inspection.

The accompanying illustration shows

a 10-inch steel fitting; the line at A showing a defect developed after use. The line does not pass clear through the casting, and no doubt the piece was amply strong to resist rupture even after the fault developed. Some of these fissures went 3 inches back and were 5 inches broad. Such a large opening in a shell is objectionable for there are blow-holes enough adjacent to it to pass steam in large quantities. Some fittings of this kind were removed from the line entirely, while others were plugged or patched.

No doubt a thoroughly sound steel casting is able to withstand highly superheated steam. There are several connected to the system under discussion. So far as it has been possible to observe, superheated steam does not of itself initiate defects and it is not supposed that the sound metal undergoes a change, either chemically or structurally. But if there is an initial defect, superheated steam is much more active in bringing out the objectionable features of that defect. It may well be that the material within the body, and not a part of the actual metal, suffers through change of some sort. This material does not add to the strength of a casting but it may serve to stop up holes if allowed to lie undisturbed.

Gun Iron.

It would appear that some material better than the ordinary steel casting was desirable for high temperature work. Such a material is found in gun iron. Gun iron is nothing more than a high grade cast iron, which any first class iron foundry can produce. In the days of the smooth bore cannon, a few foundries discovered that it was possible to produce an iron having a tensile strength of 30,000 pounds or more. The government specified it for its guns and it was called gun iron. Probably a tensile strength of 30,000 pounds is not needed in steam fittings, but iron of that quality is well adapted for 180 pounds steam with 300 degrees superheat.

From such observations as have been thus far possible it appears that certain elements in the iron are liable to cause trouble when present in excess, and perhaps the worst of these is silicon. It is at present going too far to say that every high silicon iron will fail and that every low silicon iron will prove successful, but there is much evidence pointing toward the correctness of such a surmise. In any event iron of low silicon, low phosphorus and low carbon—in other words, gun iron—has proved successful.

The following analysis shows the character of a casting which failed at 250 degrees superheat:

	Per cent.
Silicon	2.40
Sulphur	0.067
Phosphorus	0.94
Manganese	0.52
Total carbon	3.19
Combined carbon	0.25

A second failure developed in this iron:

	Per cent.
Silicon	1.98
Sulphur	0.68
Phosphorus	0.65
Manganese	0.42
Total carbon	3.31
Combined carbon	0.24

In each of these cases a sample was taken by drilling a hole straight into the body after the part had been in service a year or more and was in bad condition.

The following analysis is of an iron that has been successful in every respect for four years under 300 degrees superheat:

	Per cent.
Silicon	1.72
Sulphur	0.085
Phosphorus	0.89
Manganese	0.48
Total carbon	2.45
Combined carbon	0.17

The latter sample is from an 8-inch valve and it is tight today, no repairs whatever have been made upon the valve during the four years though the bonnet was taken off once to permit internal examination. The outer surface of the valve was covered with 85 per cent magnesia insulation, 4½ inches thick. The inner surface appeared sound; a microscope revealed no cracks or other defects. The unfinished surfaces were struck several sharp blows with a ball-peen hammer, a hand chisel was driven straight at the surface and some thick chips were cut off from the rough portion. If the metal had suffered to such an extent as cast iron is supposed to suffer, some of the defects would have made themselves manifest. After these treatments the valve was reassembled and has continued to perform its work properly. Foundrymen are not afraid to attempt to produce this iron. No difficulty whatever was encountered in securing bids for valves made of the following mixture:

	Per cent.
Silicon	1.40 to 1.60
Phosphorus	0.20 to 0.40
Sulphur	0.06 to 0.09
Manganese	0.45 to 0.75
Total carbon	3.00 to 3.25

It will be noted that the percentages of silicon and phosphorus are low.

There is of course a decided advantage in depending upon chemical analysis for determining the suitability of fittings. A hole can be drilled at any time in the actual fitting and a few grams of sample secured. Very few of us are willing to destroy a fitting to obtain a test bar, and test coupons cast in the foundry may or may not represent the actual piece.

Superheated steam was in commercial use in Europe before the practice had gained its present hold here. England and Germany were using superheated steam 20 or more years ago. The writer has not discussed this subject with engineers from abroad, but wishes to quote briefly one who has.

E. D. Dickenson, of Schenectady, on a recent trip abroad asked a great many manufacturers whether they used steel for their superheated work and received a negative reply in each instance. When the manufacturer was questioned in regard to his iron mixture he shrugged his shoulders and replied that he made his iron fit his needs, be it gas engine cylinder or steam pipe.

It was not the author's intention to state that steel of good quality will not do for superheated work. Some manufacturers are putting out fittings of open-hearth, steel which are doubtless good; but any foundry can make gun iron if it will, and delay and uncertainty will be decreased by its use.

EFFECT OF SUPERHEATED STEAM ON STRENGTH OF CAST IRON, GUN IRON AND STEEL

By Edward F. Miller.

THE object of this paper is to describe some experiments made to determine the effect of superheated steam on cast iron, gun iron and steel. From each piece to be tested two tension specimens were made, one to be subjected to the action of superheated steam, and one to be used in obtaining the original strength of the piece. All of the specimens were made with screwed ends in accordance with the specification prepared by the American Society for Testing Materials. The tension tests were made on a 100,000-pound Olsen testing machine, the specimens being screwed into spherical holders attached to the heads of the testing machine, thus insuring a straight tension pull without any bending.

The specimens to be subjected to superheat were placed on a wire grating suspended at the center of a 12-inch iron pipe about 3 feet long, supported horizontally on brackets. The ends were closed by blank flanges. Steam was supplied by a small pipe, a flow at low velocity being maintained at all times. The under side of the pipe was heated by Bunsen gas burners. Thermometers, in wells reaching down to the grating on which the specimens were placed, gave the temperature of the steam, the pressure being read from a steam gage on the supply pipe.

For the tests plotted in Fig. 1, the average gage pressure in the superheating pipe was 93 pounds and the average temperature 660 degrees Fahr. The gas flame was extinguished at 5 p. m. and lighted again at 7 a. m. The temperature reached 660 degrees Fahr., by 11 a. m. and by 5 p. m. would be as high as 700 or 720 degrees Fahr. Steam was kept in the superheater during the night. The total time these specimens were exposed to superheated steam was 260 hours, and the exposure to saturated steam was 460 hours. A chemical analysis of the iron tested is given in Table I.

Semi-Steel Mixture.

For the tests plotted in Fig. 2 the average gage pressure was 82 pounds and the average amount of superheat about 390 degrees Fahr. These specimens were subjected to superheated steam for 520 hours, and to saturated steam for 920 hours. A chemical analysis of three of the semi-steel specimens is given in Table 2. This semi-steel was made by adding 200 pounds of steel to 1,500 pounds of cast iron. The analysis of the gun-iron showed, total carbon, 3.37; graphite, 2.44; manganese, 0.34; sulphur, 0.11; silicon, 1.65.

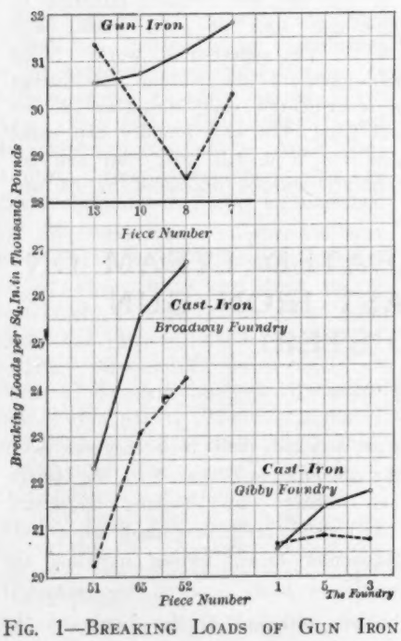


FIG. 1—BREAKING LOADS OF GUN IRON AND CAST IRON TEST PIECES SUBJECTED TO THE ACTION OF SUPERHEATED STEAM

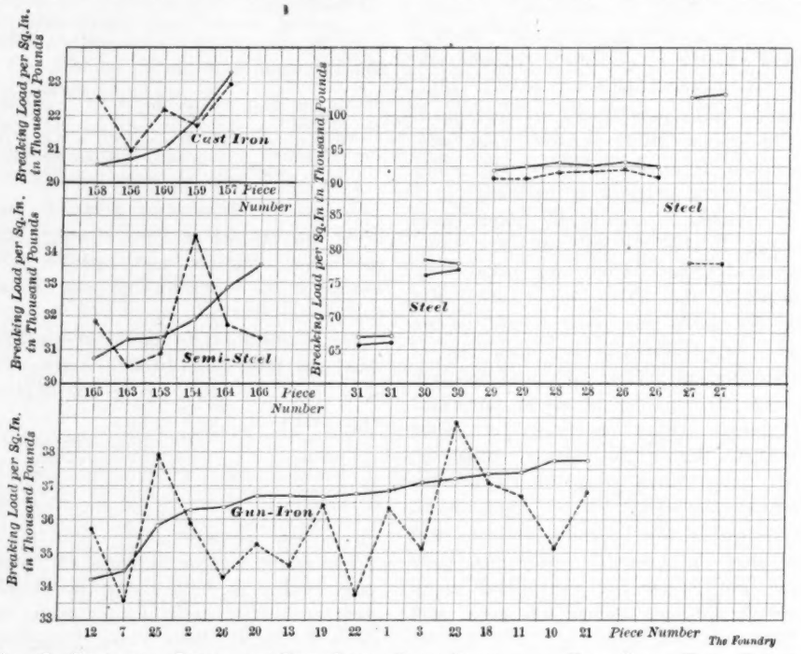


FIG. 2—BREAKING LOADS OF GUN IRON, SEMI-STEEL AND CAST IRON TEST PIECES SUBJECTED TO THE ACTION OF SUPERHEATED STEAM

The composition of two of the rolled-steel pieces No. 26 and No. 27 was as follows:

	Phosphorus, Per cent.	Manganese, Per cent.	Sulphur, Per cent.	Silicon, Per cent.
No. 26....	0.85	0.73	0.026	0.026
No. 27....	0.116	0.90	0.037	0.031

In Fig. 1 and Fig. 2 the open circles represent the ultimate strength per square inch of the original specimen,

Table I.

CHEMICAL ANALYSIS OF CAST IRON SPECIMENS, FIG. 1.

	Phosphorus, per cent.	Total carbon, per cent.	Graphitic carbon, per cent.	Manganese, per cent.	Silicon, per cent.	Sulphur, per cent.
Cast iron, Gibby foundry	....	3.51	3.02	0.37	1.88	0.05
Gun iron, Hunt Spiller	0.41	3.25	2.60	0.24	0.54	0.00
Cast iron, Broadway foundry...	....	3.34	2.84	0.38	2.26	0.09

while a full circle on the same ordinate gives the strength per square inch of the comparison specimen which had been subjected to the action of superheated steam. By figuring the per cent loss in strength in each specimen and then taking the average of these per cents it appears that the cast iron from the Broadway foundry, Fig. 1, lost 9.5 per cent; that of the Gibby foundry 2.4 per cent. The cast iron of Fig. 2 came from the Waltham foundry; here there is apparently a gain in strength of 1.8 per cent. Fig. 1 and Fig. 2 show that gun iron loses strength, Fig. 1 showing a loss of about 3.5 per cent, and Fig. 2 about 2.1 per cent. The tests on semi-steel show an average reduction of strength due to exposure to the steam, of about 0.4 per cent, four out of six pieces showed

Table II.

CHEMICAL ANALYSIS OF SEMI-STEEL SPECIMENS, FIG. 2.

Phosphorus, per cent.	Total carbon, per cent.	Graphite, per cent.	Manganese, per cent.	Sulphur, per cent.	Silicon, per cent.
....	....	2.64	....	0.11	....
0.24	3.48	2.39	0.35	0.11	1.91
0.61	3.22	2.83	0.44	0.49	2.62

quite a reduction. If piece No. 154 is not considered, the percentage reduction of strength would be much greater.

Four grades of steel were tested; two pieces from a bar of 65,000 to 70,000 pounds tensile strength, two from a bar of 75,000 to 80,000 pounds tensile strength, two each from three bars of about 90,000 pounds tensile strength, and two from a bar of over 100,000 pounds tensile strength. The 65,000 to 70,000-pound steel showed a loss of 1.8 per cent due to exposure to the steam, the 75,000 to 80,000-pound steel a loss of 1.9 per cent, the 90,000-pound steel a loss of 1.5 per cent, and the 100,000-pound a loss of 24 per cent.

While one is not justified in drawing many conclusions from the results of as few tests as are quoted here, still it is evident from Fig. 1 and Fig. 2 that the metals tested have suffered a loss in strength due to their exposure to the steam.

STANDARDIZATION RULES OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS*

By Dr. C. P. Steinmetz.

The subject of which I desire to speak is the Standardization Rules of the American Institute of Electrical Engineers. My reason for selecting this subject is that, in my experience, these standardization rules are not as well known to many engineers as their importance makes it desirable. In my opinion, the standardization rules represent the most important work the American Institute of Electrical Engineers has ever undertaken, and constitute one of the most important documents in the literature of the electrical engineering industry, for I believe that the rapid and successful advance of the electrical industry of the United States is to no small extent due to their existence.

At present few of us realize the conditions which existed before these rules were drawn up and generally adopted. These rules have made it possible to build good apparatus and sell good apparatus, which procedure was not always possible before that time. The standard set by the rules is high, but not too high. It can easily be attained, and yet it is sufficiently high to be safe, though no more. Since their adoption, the rating of any piece of electrical apparatus whatever means something definite, and means the same thing within the limits of the relative conscientiousness of the different manufacturers, no matter from what manufacturer it may be bought; and these limits are very narrow, because the tests are specified and may be easily made to check up the required performance, thus making it impossible to deviate much from the standard without having it noticed. Now that has not always been the case. On the contrary, in the early days, a small manufacturer would make high guarantees regarding the efficiency and performance of his apparatus, which an engineer, knowing all about the apparatus, could not make.

It will be realized that it was a very severe handicap to the advance of the electrical industry that those engineers who knew as much about the apparatus as was known at that time, were not able to build as good apparatus as possible because it could not be sold in competition with inferior apparatus which was guaranteed to have higher efficiencies. For instance, in those times core loss was a quantity not generally known. Quite commonly small manufacturers guaranteed efficiencies without figuring the core loss. It can be realized that a larger manufacturing company, having engineers who understood and could calculate this, might have built apparatus with much lower core loss and much higher efficiency, and still could not guarantee as high an efficiency as the manufacturer who did not take it into consideration. They knew of losses which others did not and which others therefore did not consider. At that time the commutator losses had just begun to be found out, but often the manufacturer did not dare include them in the losses because nobody else did, although they amounted to several per cent. It was a very unfortunate condition of affairs which made it necessary for those designing engineers who knew of the losses in the apparatus to count them in, while the engineers who were ignorant of their existence were able to sell inferior apparatus under higher guarantees; for the happy custom used to count only those losses which were specified, and of course the less specified the less the losses appeared.

Advantage of Standardization.

That condition of affairs has passed, and now the higher class of producers find it desirable to have everything known; to have tests of the performance and calculation of efficiency made, and the customer to know what the efficiency is, because they can gain by it. The same advantages accrue to the customer. He was formerly helpless when in the market to buy electrical apparatus, as one manufacturer guaranteed his apparatus at 92 per cent efficiency, while another and smaller manufacturer was willing to sell him the same kind of apparatus cheaper and guaranteed at 95 per cent efficiency. What could the customer know and do? That condition is not possible now, for the manufacturer could not guarantee efficiencies not in existence —he would be found out. In 1892, when I wrote a paper on hysteresis losses, I remember that one engineer even claimed there was no such thing. It could not be, because the efficiency was known. There could not be such a loss, because it would have shown up in the efficiency and it would have been noticed. All that has now become generally known and understood, and this fact is to a very large extent due to the educational work done by these standardization rules.

The benefit resulting from these rules extends throughout the entire field of electrical work. In those early days, it must be realized that it was not generally accepted and recognized that the efficiency could be got by adding the losses. Commonly the engineers or customers rejected an efficiency test made in this manner. The recognition of the correctness of the method of measuring efficiency by adding the losses has from the first been brought out in those standardization rules. I recall an instance where some big machines were built and the question was, how to measure their efficiency. The input and output could not be measured very well on a 400-kilowatt machine, which, in those days, was a monstrous machine. It was agreed that the core loss was one of the losses which was to be added. The customer insisted that it be taken at no load and full load excitation. The machine was one of those early high frequency alternators, and when run light at full load excitation gave 40 or 50 per cent higher voltage and two or three times the actual core loss obtained at full load. It took a long time to satisfy the customer that the addition of the losses gave the correct efficiency. Ultimately, however, the machines were accepted. When these machines went to England and were turned over to the customer, he would not accept them without further test; so they were coupled together, one being used as a motor and the other as a generator, and a whole series of tests were made, measuring the power input and output, and the input at all possible dis-

*Lecture before Schenectady section A. I. E. E. Nov. 2, 1909.

placements, etc., to satisfy him that the efficiency was right. He finally accepted those tests, although I do not believe they meant anything; but he got what he wanted.

We know now what the efficiency is, what the losses are, and how the efficiency should be determined. Some consulting engineers had the habit of drawing up the most wonderful specifications, often 65 pages or more, specifying everything covering the armature, conductors and many other things. This was entirely improper, because that was no business of the customer—what he looks for is the performance. Even prominent consulting engineers frequently specified things of decided disadvantage and made it possible to get the best machines for their purpose; for, while desiring to get the best apparatus, they made the mistake of specifying things which would be a disadvantage, as they were not familiar with the state of the art at that time. The early days of the industry are full of such instances.

Confusion of Terms.

Even though an agreement was reached, nothing definite was understood—it meant a different thing to different people. Speaking of the regulation of a machine, what did it mean? The Westinghouse company understood something entirely different when guaranteeing regulation from what the Stanley company or General Electric company did. The one understood the percentage rise of excitation from no load to full load, and the other, the percentage increase of voltage at full load excitation when full load is thrown off. Such disagreements naturally made matters very difficullt for a customer desiring to get apparatus, for the regulation would be guaranteed by one manufacturer as 8 per cent and by another as 12 per cent. Twelve per cent might have been a better regulation than 8 per cent because the latter might mean that if load is thrown off at full load, the voltage will not rise more than 8 per cent, and the other, if a change is made from no load to full load, a full excitation of 12 per cent increase was necessary.

Before people could understand each other and before customers could compare intelligently the offerings of different manufacturers, it became necessary to have some definite meaning for the different terms. People might use the same term and mean very different things.

The radical advance in the industry became possible only when all these children's diseases—the competition of manufacturers of inferior apparatus guaranteeing superior results by reason of lack of knowledge, etc.—became eliminated, and all manufacturers and customers could meet on a common footing, employing the same terms and having to come up to the same performance. So in those early days the question of standardization was really of the greatest importance to customers, operating engineers, and to the manufacturers; and it was natural that the question of establishing standard rules should be brought before the Institute. That this was done is due to S. D. Greene, who is still a member of the organization. Mr. Greene read a paper before the American Institute of Electrical Engineers, drawing attention to the necessity of deciding what represented the best standards, the best practice, and the best definitions in the field of electrical engineering, as far as the prominent engineers could agree on the subject. As a result, the motion was made and finally carried to establish such standardization rules, and a committee was appointed to draw them up.

Naturally, there was considerable discussion as to whether such rules would not handicap the development of the industry; they might hinder it, because of limitations, or they might sap inventive activity by establishing standards. Experience has shown that this has not been so. The rules have been very helpful in assisting development, have made unnecessary an enormous amount of waste effort, have combated foolish ideas by educating people to understand the meaning of terms, and have cleared up mistakes of understanding and make it possible for the results of the work to be recognized. If machinery and apparatus is superior it can be shown, which advantage was not always possible before. It is amusing now to remember some of those discussions. For instance, a motion was made that engineers connected with manufacturing companies should not be included in this Standardization Committee because of the fear that they might make the standard of the rules so low that it would be easy to build apparatus. As a matter of fact, most of the work on the rules as they stand has been done by C. F. Scott, of the Westinghouse Company, and by myself, both representing manufacturing companies which have always insisted on strictness and rigidity, and on making the requirements as high as could well be made, firmly resisting any attempt to reduce them. This is natural, because it can easily be seen that the manufacturer has no objection to building better machinery—it is really an advantage, because the better machinery will give a better record and not as much trouble; while if a cheap and poor machine is built the manufacturer gets the blame for it, and justly.

The standardization rules are of great advantage to the producer, to the designing engineer, and to the customer. They were started by a committee appointed by the A. I. E. E. and since then a committee for this work has been appointed every year. Every few years it becomes necessary to bring the rules up to standard and to add whatever new features have been developed in new industries that require attention.

Mistakes to be Avoided.

Standardization rules have been drawn up and an attempt made to follow them in other countries, but in no country, as far as I know, have they been so generally accepted and so helpful to the industry as here in the United States. To a very large extent this is due to the close co-operation of the manufacturers, operating engineers, and theoretical men here; but in other countries the tendency is to delegate it to the theoretical men, who draw up rules from mere theoretical knowledge, which no manufacturer or customer can follow or cares to follow, and therefore such standardization rules have occasionally been handicaps.

It is natural that manufacturers' engineers should have done most of the work in drawing up the rules, because the engineer who designs the machine, and afterwards follows it in test and is held responsible by the commercial department for its successful operation, naturally knows the ins and outs of the machine better than can anyone else. He therefore knows better to what extent strict specifications should be made in order to get the best machine; and for him it is an advantage to see that specifications are high enough, so that he may not be held responsible for troubles that develop in his production outside.

The reason that the Standardization Rules have been so successful is that, from the beginning, the principle has been very rigidly maintained that the performance should be specified and not the design data. For instance, in an armature winding, it is

proper to specify the temperature, but it would be improper to specify current density. Any specifications or standards of design data are a handicap to the development of the industry; but the standardization of performance has put a premium on designs which will make it possible to produce the same performance with a less amount of material and smaller apparatus, thus making the apparatus cheaper to manufacture.

Another mistake which has been carefully avoided, and which has been made especially by our European friends, is the attempt to specify size, speeds, etc. Such specifications tend to stop the advance of the art.

As I have already stated, the result has been accomplished by the cooperation of all representatives of the electrical industries in the country, and therefore the rules have not met with much difficulty in finding general acceptance.

We now come to a more specific discussion of some of the leading features of the Standardization Rules:

Classification of Apparatus.

Classifying apparatus as motors and generators was entirely unsuitable. If it is desired to classify and draw up rules for measuring efficiency and specify what performance should be expected from motors, it is evident that synchronous motors, direct current shunt motors, induction motors and railway motors cannot be put in the same group. They are entirely different types of apparatus. Neither can synchronous generators, direct current commutating generators, and induction generators be put in the same group. Again, a direct current generator and direct current motor are practically the same machine. A direct current motor can be run as a generator, and inversely, a direct current generator can be run as a motor. A synchronous motor and an alternating current generator are the same class and type of machine, and the specifications for the performance of each would be the same. There may be some quantitative differences of a minor nature, as for instance, if a synchronous machine is designed to operate only as a motor, a higher armature reactance is chosen than if the machine is designed to operate only as a generator. We also have compound motors and shunt generators, and a definite line cannot be drawn between generators and motors; but there is a distinct dividing line between commutating machines and synchronous machines and between induction motors and synchronous motors. In many cases machines are installed where it is impossible to say whether they are generators or motors. To-day they may be running as synchronous motors and tomorrow as generators. It is common in steam stations or water power plants to install synchronous motors to receive power from the transmission line and drive other apparatus, such as commutating machines for railway work, etc. During a period of low water it may not be possible to get power enough from the water and the synchronous motor has to be started as an alternating current generator. That is a very common thing. It became necessary to find a classification of electrical apparatus to find a clas- electrical apparatus based on its nature, structure, and construction, and not on the particular use to which it happens to be put.

As an illustration of the confusion which existed in nomenclature of electrical apparatus before these rules were generally accepted, I mention the converter and transformer. It just happened that when the Westinghouse Company started to build alternating current transformers they called them converters. When the Thomas-Houston Company, the predecessor of the General Electric Company, started to build transformers, they called them transformers; so the same type of apparatus went by the name of converter in the Westinghouse Company and transformer in the General Electric Company.

Harmonizing Terms.

A synchronous converter was developed by the Westinghouse Company which they called a rotary transformer, because the stationary apparatus was called a converter; and the General Electric Company, which had used the name transformer for stationary apparatus, naturally called the other a rotary converter. This is one illustration of the different definitions which were applied to the same things. The Standardization Rules adopted what appeared to be the best practice, and in this case adopted the name transformer because it had come into general use by other people. Rules were drawn up to establish as definitions those terms which appeared to the committee as representing the best practice and were most generally accepted. Then we find definitions of quantities like load factor, saturation factor, pulsation, etc., which had to be standardized so as to mean something definite.

With the advance of the art, this work has been expanded and new chapters inserted. The procedure which has been followed is never to standardize anything until best practice has already crystallized upon some definite form, and not to create definitions, but accept those definitions toward which good practice tends and which therefore can easily be accepted. It is no longer the definition of a competitive company, but a definition of the Institute, an impartial body. A company may hesitate to change the name of its apparatus and adopt the name used by a competitor, but there can be no hesitation to adopt the name given to it by the general body of the Institute; and this tends to uniformity, which is not only desirable but absolutely necessary.

Measurement of Efficiency.

Then comes the second part of the rules, covering specifications of performance of apparatus, and tests; that is, how the apparatus should perform and how this performance should be determined by test. It can be readily appreciated that one of the most important considerations is efficiency—the definition and determination of efficiency—and one of the most important features of the work done by the rules is the establishment of a method of measuring efficiency by adding the losses, making that method safe by carefully scrutinizing the losses and showing how they should be measured. These efficiency specifications and the method of making tests are well worth careful study, because they are really the general standard for testing electrical apparatus.

In the matter of insulation, which is an important one, attention is directed to the importance of high voltage tests and the relative unimportance of measuring the ohmic resistance of insulation. The ohmic resistance of the insulation is increased by baking, and in this way one could get 50 megohms or more; but this is liable to weaken the dielectric strength of the insulation. Tests of ohmic resistance are desirable as merely showing that there is no great leakage but they do not show how the insulation will perform, which performance is given by the dielectric test. A standard of one minute has been established for tests for dielectric strength. It is unsafe and objectionable to extend the time of test much longer, because of harm to the insulation. High voltage tests must be made at voltages very much higher than those to which the insulation

will be normally subjected, and such high voltage puts a strain on the insulation which deteriorates it. Therefore, the test should not be continued longer than necessary to make sure that the voltage is there, and one minute is sufficiently long for this purpose. With some kinds of apparatus, however, a half hour is specified. With some apparatus half an hour is not so bad, although a minute is better. Naturally when saying a minute is better, the same test is intended to be applied. One minute at 25,000 volts is preferable to half an hour at 10,000 volts. The shorter the time the voltage is kept on, with correspondingly higher voltage used to get the same severity, the less will be the deterioration of the insulation.

Test Requirements.

Apparatus must be tested with at least twice its rated voltage—twice the rated voltage of the circuit to which the apparatus is to be connected—except, of course, on machines for very low voltage, on which tests are made at a voltage much higher in proportion. There would be no sense in testing a 100-volt machine at 200 volts; but when you come to 10,000 volt apparatus, the test which experience has shown is sufficiently high, but not too high, is 20,000 volts, which really means four times the normal voltage strain. The reason that this is necessary is because of the abnormal conditions of operation which may occur. On a high voltage system, if one side of the winding becomes grounded, the whole rated potential is exerted between the winding and the iron; and in normal operation during conditions which we must expect frequently, voltages occur which last but for a small fraction of a second that are as high as the testing voltages of the apparatus. No insulating material can stand higher voltages momentarily than continuously. It would not be safe to lower the testing voltage. Once it was done. It was very difficult to test alternators at double voltages. At that time a 20,000 volt alternator could be built that could be tested at 30,000 volts, but which would not stand 40,000 volts. Since the engineers agreed that it would be desirable to have such alternators, they asked the Standardization Committee to lower the specification for high voltage apparatus to 1½ times the rated voltage. All kinds of breakdowns followed the introduction of this practice, and we came back to the double voltage, and experience has shown that the double voltage is not too high and not too severe a test.

Then going further, overload capacities is another point. Very great difficulty existed formerly in comparing our apparatus with foreign makes, and it has often been noticed how superior the continental companies are in their designs; how much smaller and cheaper their smaller motors are; but they do not follow the Institute rules, and a 5-horsepower motor may mean a very different thing with them from what it does with us. It may mean a motor which can give power at but 5 horsepower, or it may mean a motor which can continuously carry power averaging 5 horsepower; sometimes going below that figure. The tendency here in America has been to rate the apparatus at the average output which it can give. Without any guidance of standardization rules, the tendency has been very often to rate apparatus at the maximum which it can perform. Naturally, where these two classes of apparatus are compared, the one appears very much larger and more expensive than the other. The uniform rating which has been established as a minimum is 25 per cent overload for two hours, and for motors or apparatus which may go out of service by reason of excessive overload, 50 per cent overload for one minute. One minute means that it shall be able to carry 50 per cent overload at least, without stopping, falling out of step, or doing anything to interrupt operations.

The Value of the Rules.

Now as to temperature rise: The uniform rating of 50 degree Cent. rise by resistance of 40 degree Cent. by thermometer has been established for all apparatus, with a few exceptions. Commutators and brushes are allowed 5 degree Cent. more. In looking over these specifications we must naturally realize that they do not attempt to represent best practice, but the maximum safe value. It does not mean best practice to specify 50 degree Cent.; very commonly 40 degree Cent. is called for. In drawing up general specifications, it is not safe to permit a rise of more than 50 degree Cent.

I have spoken of standardization rules, but really, as they stand at present, they constitute a list of all electrical apparatus, and very few, if any, kinds of apparatus which is used or contemplated in any electric light or power system, are not mentioned, described and classified in those rules sufficiently for an engineer to be able to handle them and know what to do with them, and specify their performance. In this respect they are more complete than any text book of electrical engineering I know of, for during the last twelve years so many people have worked on them, studied them, and discussed them, that they have really become a very complete compendium or dictionary of electrical apparatus in the matter of its performance and test.

PERMANENT EXPANSION OF CAST IRON UNDER MODERATE TEMPERATURE.

In May, 1909, Crane Co. made two straight bars of cast iron, ¼ by ½ inch, accurately machined. One bar measured 18.336 inches and the other 23.382 inches. These bars were placed in a steam-heated core oven where there is an even temperature of 325 degrees Fahr. At the end of five weeks the shorter bar had a permanent expansion of 0.003 inch, and the longer 0.008 inch, the lengths being 18.339 inches and 23.390 inches.

In July the bars were transferred to a second oven in which the temperature fluctuates a little, but averages 600 degrees Fahr. After being in this oven 30 days the lengths had increased 0.145 inch and 0.177 inch.

The bars were then returned to the oven for another 30 days and gained 0.014 inch and 0.028 inch, respectively, in the second period.

	Ins.	Ins.
Original lengths	18.336	23.382
Gain in five weeks at 325°	0.003	0.008
Gain in thirty days at 600°	0.145	0.177
Gain in thirty days at 600°	0.014	0.028
Final lengths	18.498	23.595

The permantnt expansion at a temperature of 325 degrees (equivalent to 82 pounds steam pressure) was very small, but at 600 degrees it equalled in 60 days 0.104 inch per foot on both bars, which is an extraordinary amount.

The measurements were taken with the greatest care and carefully checked. Further experiments along this line of investigation are being conducted. —*Valve World.*

The Houston Structural Steel Co., Houston, Tex., has prepared plans for developing its present plant, as well as adding additional machinery equipment, which will treble its present capacty. The estimated cost of the new buildings and equipment is $35,000. During the year the company installed $20,000 worth of machinery, including a 42-inch friction saw for rapidly cutting through iron and steel.

DEVELOPMENT OF MECHANICAL PROCESSES IN THE FOUNDRY

The "Shockless" Molding Machine

The evil effects of foundation shocks in jar ramming molding machines are overcome in the "shockless" jarring machine, shown in the accompanying illustrations.

As shown in Figs. 1, 2 and 5, this machine consists of a jarring table cast integral with the cylinder, and mounted upon a cylindrical anvil, which in turn is guided by a cylindrical base and rests give the anvil a substantial upward velocity while the table is falling. The movement employed in this machine to overcome the shock is best defined as libratory, which denotes "countervailing forces opposing each other." It will be noted in Fig. 5 that the supporting springs beneath the anvil carry the entire load of the anvil, table and mold, and they do this under static conditions, and also while the table is rising. However, when the table reaches the upward limit of its travel, and when the air is exhausted to let it drop, the anvil is suddenly relieved of the air pressure which supported the table, and the springs beneath the anvil expand and accelerate its upward movement while the table is falling. As a result, the momentum of the falling table and load is substantially equal to the momentum of the rising anvil at the instant of impact. These momenta neutralize each other, and the table is brought to rest without shock or jar as completely as if it had dropped upon an anvil of infinite weight. To accomplish this, the springs beneath the anvil have a very long compression, so that their loss in supporting power, as the anvil rises, will not materially affect its velocity.

Ordinarily, the springs are sufficient to give the desired momentum to the anvil, but in large machines where the consumption of air is an important item, it is advantageous to utilize the air discharged from the jarring cylinder in augmenting the momentum of the anvil. This is accomplished by making an additional port in the operating valve, which connects the jarring cylinder and anvil cylinder while the table is falling. When the operating valve is again shifted to lift the table, the valve is opened to exhaust and the anvil is, therefore, free to drop.

In the construction of this machine, careful consideration was given the economical use of air, and the operating valve is designed to use it expansively in the jarring cylinder, as well as to expand it again in the anvil cylinder, thus obtaining the benefit of two expansions. Of course, it is not possible to use the air expansively in the jarring cylinder when the load carried on the table approaches the maximum capacity of the machine, but when the machine is used on lighter loads, full air pressure can be admitted for a short distance and then cut off absolutely and expanded in the cylinder. When the table reaches its maximum travel, the operating valve is automatically shifted to exhaust, and the air from it may pass directly into at atmosphere or into the air cylinder, if the machine is large enough to make a second expansion worth while.

The cut-off is operated directly through the bell crank lever acting as an adjustable stop upon an arm attached to the valve stem. The valve is reversed through the action of a pilot valve actuated by a similar bell crank lever. There are, therefore, two adjustable stops on the table of the machine, the positions of which are controlled by latch levers on the operating stand, shown in Figs. 1 and 5. The cut-off can be adjusted to suit the load carried on the table, and the operating valve can be reversed by the pilot valve when the maximum lift desired has been reached. Fig. 3 shows the bell cranks controlling the variable stroke of the jarring table and the automatic cut-off of the piston valve. This valve is of the differential pressure type operating by constant and intermittent pressure through

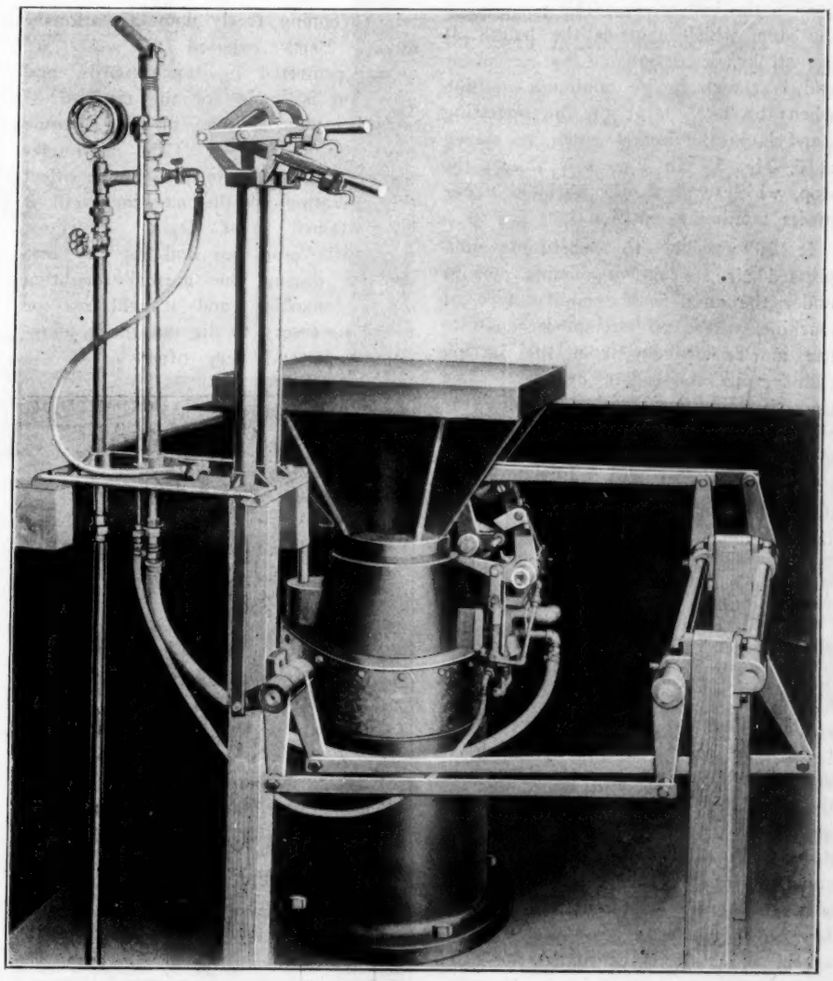


FIG. 1.

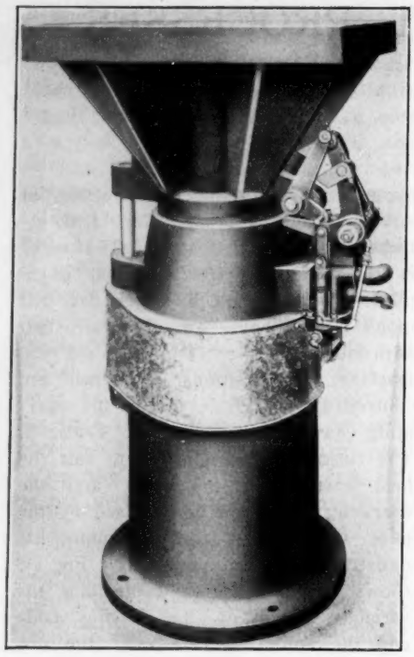


FIG. 2.

the pilot valve shown connected by link to the bell crank. The position of the stop, which controls the length of the stroke, is designated by an arrow and is shown in its minimum position when the latch lever on the operating stand is in the lowest notch, as shown at 3, Fig. 5. In Fig. 4 is shown the stop, which controls the variable stroke in its maximum position.

It is possible to substitute compressed air for the supporting springs under the anvil in the similar type of machine, where no attempt is made to use air expansively from the jarring cylinder to the anvil cylinder. The use of compressed air to support the anvil necessitates some provision for keeping the pressure adjusted to the total load carried without causing undue variation in the height of the jarring table, as it is more or less loaded, and as air may leak in or out. The use of long compression springs somewhat simplifies the construction, and has the further advantage of making it possible to utilize the complete expansion of the air.

The effect of impact between the table and anvil in jar ramming is measured by the change in velocity of the table, and the square of this change in velocity is proportional to the work done upon the sand for any assumed condition of the sand. Naturally, the maximum work is done in the first few blows when the sand is loose and as the operation is continued the sand becomes more and more firmly compacted until finally it acts as one solid mass, and no further work can be done upon it until the severity of the blow has been increased. A short stroke, indefinitely repeated, will compact sand up to a certain density, and a long stroke will compact it to a greater degree of density, and very hard ramming, such as is frequently required in steel foundries, can only be effected by a considerable length of stroke. Therefore, a variation in the length of stroke from 1 to 4 inches, depending upon the conditions to be met, has been provided, and should a drop of more than 4 inches be required, this could easily be provided for in the valve controlling mechanism, shown in Figs. 3 and 4.

The cast steel table is designed to insure great strength and stiffness, being ribbed around a central cylinder, acting as a beam of great depth to distribute the central force of impact applied to it equally in all directions. The anvil is absolutely solid, and the blow delivered in this way by impact between two masses having approximately the same momenta, is more efficient than can be obtained from a table dropping freely upon a stationary anvil. Parts exposed to wear are amply protected by sand guards, and provision is made for the removal of such bearings as may in time become more or less worn. The accumulation of sand in the pit cannot affect the operation of the machine until it has attained great depth. However, very little sand can find its way into the pit during the normal operation of the machine, and it will not be found necessary to dig out the accumulation of sand very often.

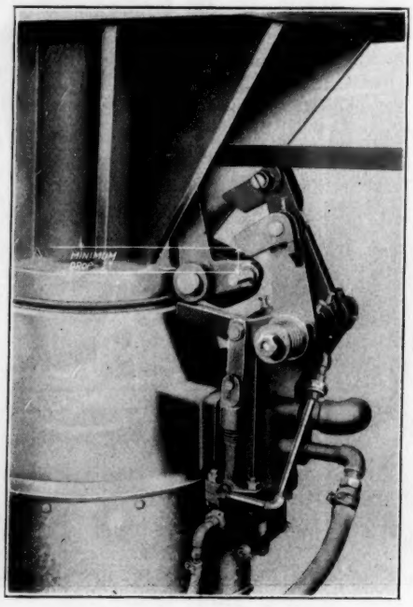


FIG. 3.

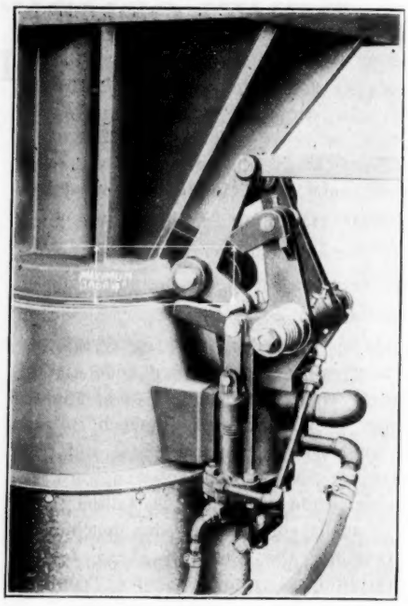


FIG. 4.

A small machine of this type, weighing about three tons, has been satisfactorily tested, and its operation has demonstrated that no shock whatever on the foundation is perceptible. This machine was mounted on two 8-inch beams in a pit about 10 feet wide, the beams resting upon the sides of the pit, and the machine being placed at the center. A man standing on these floor beams, while the machine was being operated could detect no vibration, and although there was necessarily a slight change of load as the table rose and fell, the effect on the floor beams was no greater than it would be for an ordinary power squeezer operated in the usual way.

Ordinarily, supporting springs under about 8 inches compression are used to carry the full load, and with a 4-inch stroke on the table, the anvil movement will probably not exceed 2 inches, while ordinarily it will be very much less. The maximum variation in floor load would, therefore, not exceed 25 per cent of the total load resting upon the supporting springs, and this variation is so gradual that it does not partake of the nature of a shock. At the moment of impact expansion of the supporting springs simply ceases and, consequently, reduction of the load on the foundation is carried no further. Following this they again compress and gradually increase the load on the foundation by a comparatively small percentage of the total load carried.

This machine is built by the Tabor Mfg. Co., molding machine maufacturers, Philadelphia.

A NEW SLAG PRODUCT.

Still another use is being found for blast furnace slag. An invention is undergoing trial in the north of England for making artificial slates, building blocks, bricks, slabs, tiles and the like out of this waste material. It is claimed that by adding certain proportions of sand and sulphate of soda, and in some instances a little lime to the slag while in the blast furnace, a vitreous material is produced which can be cast into blocks, or rolled out either with or without enclosed wire so as to form materials for building and other purposes. Material so produced, it is said, is impervious to water and can be used in a translucent state for roofing and other purposes, thus saving expense of skylights and window frames. It is capable of being molded in ornamental patterns, and it is suggested that the use of this material for building would not only make the buildings in themselves more attractive, but would prevent that accumulation of soot and grime which so disfigures large cities. The material, it is stated, can be produced in every variety of color and shade. Where the vitrifying material cannot be put into the blast furnace the slag can be run off and treated in a reverberatory furnace.

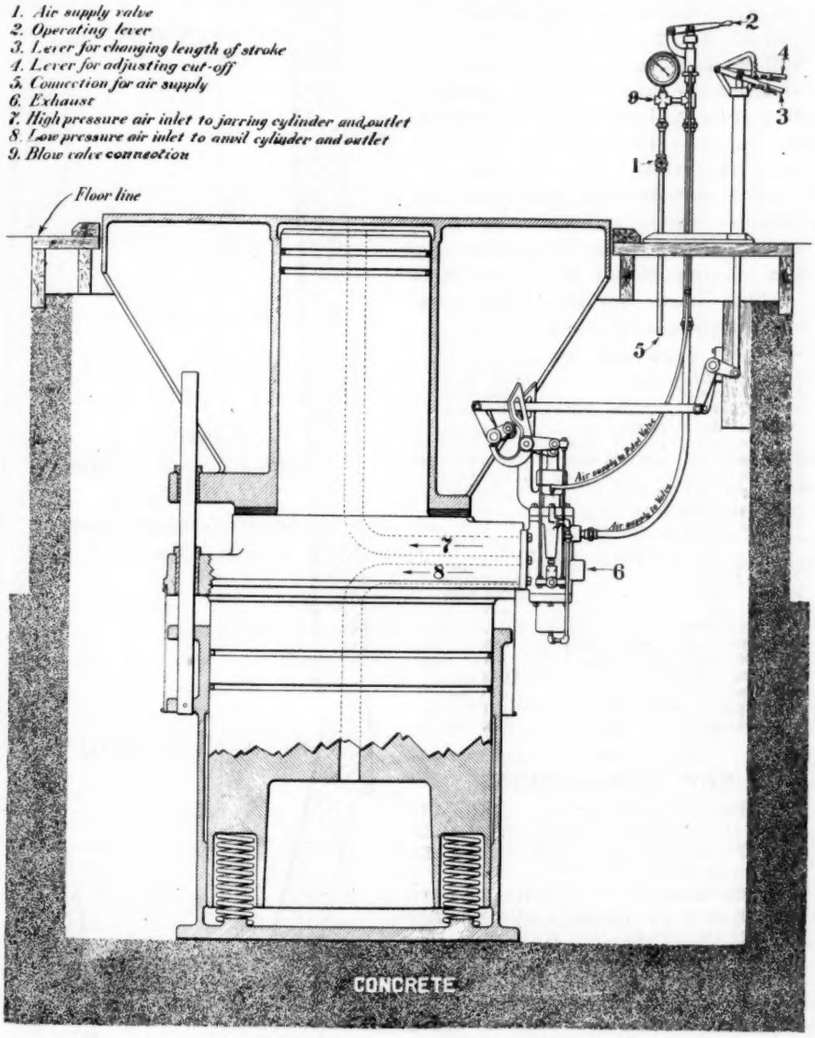

1. Air supply valve
2. Operating lever
3. Lever for changing length of stroke
4. Lever for adjusting cut-off
5. Connection for air supply
6. Exhaust
7. High pressure air inlet to jarring cylinder and outlet
8. Low pressure air inlet to anvil cylinder and outlet
9. Blow valve connection
Floor line
CONCRETE

FIG. 5.

A CREDITABLE GAS ENGINE PERFORMANCE.

We have recently been favored with some data covering six months' operation of an installation of four Allis-Chalmers gas engines, direct coupled to four 2,000-kilowatt alternators, at South Works of the Illinois Steel Co.

The average monthly output for the period was 4,000,000 kilowatt-hours and the average hourly output of the entire station 5,600 kilowatts. The average heat value of the gas over the whole period was 97.5 B. T. U. per cubic foot of gas, and the average heat consumption 15,800 per kilowatt-hour.

It appears from the foregoing that the average load factor was 0.70, and as the generator efficiency could certainly not be higher under such conditions than 85 per cent, the heat consumption per brake horsepower-hour approximated 10,000 B. T. U., and the gas consumption about 103 cubic feet, both of which must be considered as very satisfactory. If the generator efficiency was anything lower than the assumed 85 per cent, the heat efficiency of the engine is correspondingly improved.

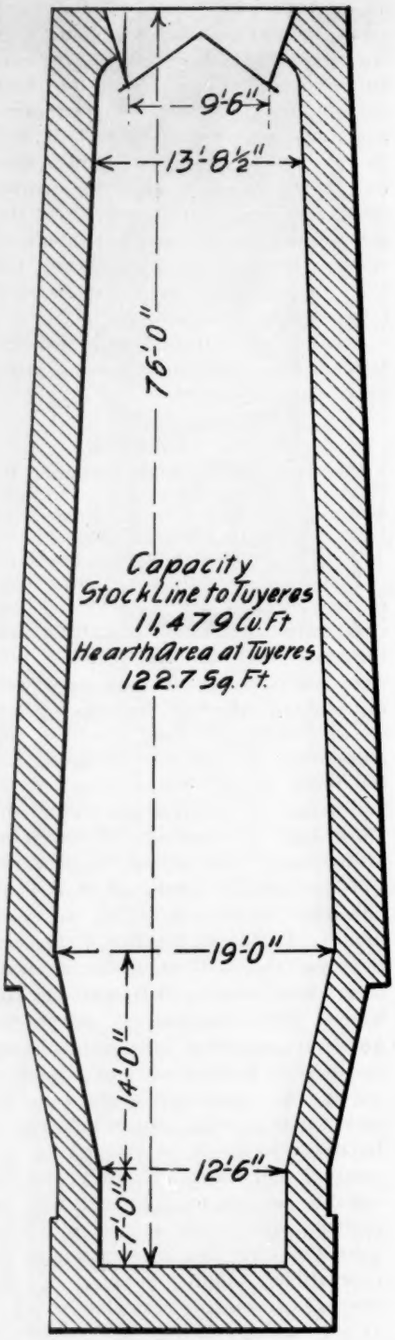
Accurate data from long-period performance is sufficiently rare to make these figures valuable.

BOOK REVIEWS.

Elements of Machine Design. By Dexter S. Kimball and John H. Barr. 440 pages, 6 x 9 inches. New York John Wiley & Sons. Supplied by THE IRON TRADE REVIEW for $3 net.

There can be little doubt that there is ample room for a work of this character, though it is a little unfortunate that a less familiar title were not chosen. It may very well be doubted whether the existing lack of knowledge of the primitive requirements of machine designing as set forth in the earlier pages is to be found in conjunction with the knowledge of mathematics which is presupposed, and in this respect the work resembles nearly all books by university instructors. They are positive as to the necessity for instruction, yet they are unable to separate themselves from the methods by which they themselves solve the problems presented. Between the necessity for instruction and the solving of the equations involved in design exists a wide gap which unfortunately can never be bridged by calculation and must ultimately and inevitably be left to judgment and experience, and it not infrequently happens that the two are apparently incompatible, simply because of the absence from the calculation of a factor which cannot be stated in terms and can only be supplied by experience.

It is perfectly evident then that no treatise on the subject of machine design should be criticised because of the absence of such factors, but the student should be thoroughly impressed with the thought that the treatise, while pointing the way to the analysis of such problems as are susceptible of treatment, is in no sense the end of the subject. It is really only a beginning and the authors would have been more just to themselves and the student if the fact were emphasized. Otherwise the work is beyond praise.



FURNACE NO. 1.

AN EXCELLENT BLAST FURNACE PERFORMANCE.

We have received from the Carnegie Steel Co., Bellaire works, a report of the December working of their Nos. 1 and 2 furnaces, which is reproduced herewith, together with sections of the stacks.

The performance of these stacks, as shown by the output of iron, the quantity of coke used, etc., illustrates graphically the care and thought which the present day management gives to the blast furnace under its charge. The size of the output is one thing; the fuel cost is another, especially in the eyes of the works accountant. The Bellaire stacks here show an average coke consumption of but 2,048 pounds per ton of pig iron output, which is considerably below the usual standard practice of at least one ton of coke per ton of pig iron output. The amount of limestone used will in itself be to every experienced blast furnace man a sufficient commentary upon the kind of ore charged into the stack. It should be borne in mind that these notes are from the regular operation of the stack and that no special efforts were being made for a record. As a matter of fact, the figures for the record week of both stacks are somewhat higher than those shown above.

FURNACE NO. 1.

Total product	12,752 tons.
Record week	3,005 tons.
Record day	495 tons.
Average daily product	411.4 tons.
Per square foot hearth area	3.353 tons.
Per 100 cubic feet capacity	3.584 tons.
Air per minute	35,110 cu. ft.
Coke per ton iron	2,071 lbs.
Stone per ton iron	955 lbs.
Loss in yield	0.17 per cent.

FURNACE NO. 2.

Total product	12,629 tons.
Record week	3,004 tons.
Record day	459 tons.
Average daily product	407.4 tons.
Per square foot hearth area	3.602 tons.
Per 100 cubic feet capacity	3.65 tons,
Air per minute	34,023 cu. ft.
Coke per ton iron	2,025 lbs.
Stone per ton iron	921 lbs.
Loss in yield	0.38 per cent.

NEW PUBLICATIONS.

PRODUCTION OF COAL, COKE AND PEAT IN CANADA DURING THE CALENDAR YEARS 1907 AND 1908.—Ottawa, Department of Mines.

PRODUCTION OF NATURAL GAS AND PETROLEUM IN CANADA DURING THE CALENDAR YEARS 1907 AND 1908.—Ottawa, Department of Mines.

PRODUCTION OR IRON AND STEEL IN CANADA DURING THE CALENDAR YEARS 1907 AND 1908.—By John McLeish; Ottawa, Department of Mines.

TESTS OF RUN-OF-MINE AND BRIQUETTED COAL IN A LOCOMOTIVE BOILER.—By Walter T. Ray and Henry Kreisinger; Washington, U. S. Geological Survey.

"REGAL ANNOUNCEMENT."—Leaflet distributed by H. W. Johns-Manville Co., New York.

LEBER HOUSE SHUT-OFF VALVE.—Leaflet distributed by Leber Mfg. Co., Cleveland.

FAIRHURST AIR COMPRESSORS.—Leaflet distributed by American Air Compressor Works, New York City.

NEW CATALOGS.

STEEL MINE CARS.—The Watt Mining Car Wheel Co., Barnesville, O., has issued a 32-page 5½ x 7¾-inch catalog descriptive of its steel mine cars, of which they show numerous illustrations of types designed for every variety of service.

GEAR CUTTING MACHINES.—The Newark Gear Cutting Machine Co., Newark, N. J., has sent out its catalog No. 1, 1909, 64 6 x 9-inch pages descriptive of its line of gear cutting machines for the production of spur, bevel and worm gears, with tables of proportions of gears for metric, circular and diametral pitches.

FURNACE NO. 2.

FOUNDRY TRAMRAILS.—Bulletin No. 20, 36 6 x 9-inch pages, has been received from the J. W. Paxson Co., Philadelphia, describing the Moyer foundry tramrail as applied to various foundry services, including the transportation of iron, cores, sand, castings and miscellaneous material and equipment.

ELECTRIC LOCOMOTIVES.—Bulletin No. 1090, 52 6 x 9-inch pages, has been received from the Atlas Car & Mfg. Co., Cleveland, descriptive of its electric locomotives, of both storage and trolley types, storage battery trucks, electric cars for ore, coal, concentrates, coke, etc.

NEWS FROM MANY INDUSTRIES

(In order to assist the post offices in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporation:

The Allen Murphy Co., Chicago; machinery; $10,000; by Emmett L. Murphy, Louis S. Allen and Paul P. Harris, all of Chicago.

The Winfield Electric Welding Machine Co., Warren, O.; $9,750; by W. C. Winfield, R. A. Cobb, G. W. Bayard, J. H. Ewalt and B. C. Taylor.

The Hill Pump Valve Co., Chicago, machinery; $25,000; by Joseph E. Hill, William M. Gilbert and Theodore M. Gilbert, of Chicago.

The Illinois Steel Warehouse Co., Chicago; $100,000; steel, iron and other metals and products thereof; Norris E. Crull, Ralph E. Church and Hugh T. Martin.

The Ducharme Wrench & Novelty Mfg. Co., Johnstown, Pa.; $25,000; by James C. McCloskey, William S. Ducharme and George J. Griffiths, all of Johnstown, Pa.

The Phineland Machine Works Co., New York City; machinery, tools, etc., of all kinds; $25,000; by George D. Zahm, William Ehrlich and Isador N. Goldman, all of 261 Broadway, New York City.

The Toledo Electric Welder Co., Cincinnati, O.; $75,000; Claude B. DeWitt, H. M. Heatley, Charles V. Baumgardner, S. B. Ransom and A. J. Scheuer. The company will erect and operate an electrical supply plant in Cincinnati to give employment to 100 men.

New Construction:—

Construction has started on the proposed plant of the Birmingham Rail & Locomotive Works, at North Birmingham, Ala.

The Adolph Leitelt Iron Works, Grand Rapids, Mich., has begun work on a two-story brick addition to its plant, estimated to cost $5,000.

The Grant Iron Works, Houston, Tex., is building an addition estimated to cost $35,000, it being cramped in its present quarters for room.

The American Ornamental Iron & Bronze Co., Minneapolis, whose incorporation was recently noted, is planning to erect a new plant at Bryn Mawr, Minn. It will manufacture various kinds of ornamental iron and bronze work, both cast and wrought, such as stairs, grilles, gates, fences, etc. Frederick H. Wallis is president of the company, and Hubert Kelly is treasurer.

The Reliance Boiler Works, Milwaukee, has taken out a building permit for a building at Thirtieth and Hadley streets, estimated to cost $15,000.

The Vulcan Iron Works, New Britain, Conn., has taken out a building permit for a foundry 110 by 203 feet, and an ell 20 by 32 feet, estimated to cost $16,000.

The Anniston Iron & Steel Co., Anniston, Ala., has under advisement plans for doubling the capacity of the plant, according to a statement made by President E. L. Turner.

The American Pulley Co. has bought a tract of about five acres at Wissahickon avenue and the Philadelphia & Reading railway, Philadelphia, upon which it proposes to construct plant additions.

The Northern Engineering Works, Detroit, builder of Northern cranes, has purchased additional land adjoining its present site, on which it will probably make extensions of its crane plant in the spring.

The Buckeye Traction Ditcher Co., Findlay, O., advises respecting its recent increase of capital stock from $100,000 to $300,000, that it has constructed the foundation, 120 x 300 feet, for another factory building, which will cost with machinery equipment, about $60,000.

Crawford & McCrimmon, Brazil, Ind., manufacturing hoisting engines, fans and pumps for mines, has placed a new brass plant in operation. The company built the foundry because of difficulty experienced in buying in the market the quality of phosphor bronze which it desires to use in its acid proof pumps.

The American Malleables Co., with general offices at Lancaster, N. Y., advises respecting its recent fire at Lancaster that it is rebuilding the burned portion of its foundry and expects to have it in full operation in about a month. In the meantime, it is operating about 50 per cent of its capacity.

President J. H. Hoadley, of the Alabama Consolidated Coal & Iron Co., while at Gadsden, Ala., recently, reiterated his former statement to the effect that his company will build a steel mill there; that plans and estimates are being made, and that definite announcement may be made within a few months.

The Davenport Locomotive Works, Davenport, Ia., has completed plans and specifications for new buildings to be constructed in the spring, estimated to cost $250,000. The buildings include new pattern, blacksmith, machine and erection shops, which will add over 55,000 square feet to the present plant. The new building will be erected west of the present plant, and will be equipped with the newest machinery ideas.

The Midland Metal Mfg. Co., Ottumwa, Ia., has completed the construction of a fireproof building 40 x 60 feet, one story, with provision for future extensions. The company proposes to manufacture from sheet metal such as corrugated road culverts, steel watering tanks and several articles of its own invention. It has placed orders for practically all the machinery it will purchase, with the exception of a machine for pressing roof ridge roll, and a heavy beading machine, 10 feet long, to work as heavy as 16-gage material.

The Standard Brass & Copper Co., New London, Conn., which was organized several months ago to manufacture seamless brass and copper tubes, has been obliged by increasing business to add to its new equipment including new straightening and drawing machines. The new plant of the company is located in the industrial building at the corner of Woodbridge and Division streets. It is 130 x 656 feet, with an annex 20 x 35 feet, one story, brick. The main floor is devoted to the entire machinery equipment, while the cupola and boilers are placed in the annex. The equipment includes five furnaces with a daily capacity of 5,000 pounds of brass.

General Industrial:—

The Scott-Madden Iron Works Co., St. Louis, has increased its capital stock from $75,000 to $150,000.

The Western Machine Works, Indianapolis, has certified to an increase of capital stock from $6,000 to $10,000.

The Pittsburg Piping & Equipment Co. has just completed the installation of a high and low pressure pipe line and new power house for the Sioux City Service Co., Sioux City, Ia.

The Bartlesville Foundry & Machine Co., Bartlesville, Okla., has been made

defendant in a suit by R. L. Beattie and L. A. Rowland, trustees, to compel the sale of the plant to pay two notes of $10,000 and $8,000 and other indebtedness.

The Frank Davies Co., New Orleans, whose incorporation was recently noted, advises that it is simply the incorporation of the firm of Frank Davies, dealer in railroad equipment. The firm was previously operated by Frank Davies individually.

The Freeport Gas Machine Co., Freeport, Ill., has increased its capital stock to $25,000, from $12,000.

The Illinois Bridge Co., Inc., Jacksonville, Ill., note of whose increase of capital stock was recently made, advises that it contemplates no new improvements at this time.

The plant of the Solid Steel Casting Co., Chester, Pa., has been sold to Burrows Sloan, of Philadelphia, at his bid of $101,000, which included a mortgage of $100,000 held by Luther S. Bent, with interest from July 1, 1906. The previous sale was not confirmed by the court, since it ignored an arbitrator's award as a lien.

The Economy Woodworking Machinery Co., 309 Broadway, New York City, advises respecting its recent incorporation that this company was organized to make the new Economy woodworker, a combination machine especially designed for pattern makers, wagon workers, carpenters and kindred trades.

The American Machine Co., Eau Claire, Wis., manufacturing automobile appliances, whose incorporation was noted last month, advises that it has already equipped a shop with up-to-date machines for manufacturing automobile specialties. It further advises that it does not need any more equipment or machinery at this time.

The Kansas City Structural Steel Co., of Kansas City, Mo., closed contracts the past week with the Kansas City Star for 1,000 tons of structural material for the newspaper's proposed building; also with the Grand Ave. church for 520 tons; as well as with the Empire Electric Co. for a proposed power house at Riverton, and an office building in Kansas City, 300 tons.

The Ironton Iron Co., at its annual meeting, elected the following officers and directors: President, Col. H. A. Marting; vice president, C. B. Fowler; secretary and treasurer, W. W. Marting; D. C. Davies, E. O. Marting, F. L. McConley, A. Clark Lowry, A. H. Mittendorf and W. A. Murdock. The statement of earnings was not made public.

The Marting Iron & Steel Co. organized by electing the following named officers and directors: Col. H. A. Marting, president and general manager; C. B. Fowler, vice president; E. O. Marting, secretary and treasurer; A. H. Mittendorf, A. Clark Lowry, W. A. Murdock and J. H. King. No public information was given as to dividends.

The entire property of the Duplex Roller Bushing Co., Belfast, Me., including lands, building, equipment, etc., which inventoried at $69,500, has been sold by the receivers to H. Holton Wood, of Boston, for $40,000. The concern went into the hands of receivers last October, upon the petition of Mr. Wood, vice president, who presented a claim of cash loans of $104,443.

The Fawcus Machine Co., Pittsburg, has purchased the plant of the Fischer Foundry & Machine Co., at Ford City, Pa., and is preparing for an early resumption of operations. The plant was recently bought in by other parties at a public auction of the trustee in bankruptcy, and has now been transferred by the purchaser to the Fawcus company. The plant consists of modern buildings and equipment and a site of about 10 acres of ground.

The Portland Iron & Steel Co., Portland, Me., has received a contract from the Portland Co. to build a steel stack at Ligonia, Me., 125 feet high, and 5 feet in diameter. The Portland Iron & Steel Co. has just completed erecting a large penstock for the Rumford Falls Power Co., Rumford Falls, Me., 13 feet in diameter, and 1,300 feet long, making this penstock one of the largest ever constructed. The company also completed erecting a stand pipe 95 feet long and 18 feet in diameter at Madison, Me., for Hollinsworth & Whitney.

Willis H. Steele has disposed of his interest in the company operating the Chicago Stove & Range Co., of Chicago, the Mattoon Stove Works, of Mattoon, Ill., and the Mississippi Valley Stove Works of Fulton, Ill. The entire interest in the three plants has been transferred to J. E. Fitzgerald and Frederick Welder. Mr. Steele had announced a number of times that when he arrived at the age of 50 he meant to retire from active business life. On Dec. 29, which was his fifthieth birthday anniversary, he closed out his interest in his industrial properties, and retired.

Stockholders of the H. E. Mills Mfg. Co., Syracuse, N. Y., at its recent annual meeting, elected these directors: H. E. Mills, L. D. Douglas and Frank T. Mills, of Syracuse, and N. H. Childs and W. H. McIlravy, of New York City. The directors reorganized by electing these officers: President and treasurer, H. E. Mills; vice president and general manager, L. B. Douglas; secretary, Frank T. Mills. The directors decided to begin the construction of a plant at Solvay, N. Y. The company manufactures dry core compounds used in iron and steel foundries.

Trade Notes:—

H. W. Bryant, formerly at 115 Adams street, Chicago, has become associated with R. P. Rolfe in the Rolfe Iron Co., 111 Clybourn place, Chicago, manufacturer and dealer in general scrap. This company has equipped an up-to-date yard, and will conduct both a brokerage and yard business.

Ernst Wiener Co., New York City, railroad specialist, announces that it has opened new offices in these cities: Petersburg, Va., at 38 Sycamore street; Ocala, Fla.; Toronto, Can.; and Mexico City, Mex., at Apartado 123 Bis. The addresses of several other offices have been changed, the new addresses being: Los Angeles, 223 W. H. Hellman building; Philadelphia, 1103 Land Title building; San Francisco, 112 Market street.

The Whitney-Kemmerer Co., with offices at 621-22 Lewis block, Pittsburg, has been organized to do a general pig iron, coal and coke business. The company has branch offices at Cincinnati, First National Bank building, Philadelphia, Stephen Girard building, New York, 143 Liberty street, and Boston, 141 Milk street. Chas. S. Bygate, formerly general sales agent for the Pickands-Magee Co., Pittsburg, has become associated with the Whitney-Kemmerer Co.

Fires:—

The Columbus, O. plant of the United States Cast Iron Pipe & Foundry Co. was damaged Jan. 11. the loss being estimated at $8,000.

The Bay City Boiler Works, Bay City, Mich., sustained damage estimated at $1,500 Jan. 4, the fire starting in the main building. The loss is covered by insurance.

Crossed electric wires on Jan. 8 caused fire damage to the machine shops of Keelyn Electrical Co., $8,000; Downey & Kruse Co., heating contractor, $15,000; Northwestern Pattern Works, $1,500 and Bayley Heating Co., $12,000 at 133-135 Sycamore street, Milwaukee. All were covered by insurance.